

\\tycomdcw\projects\50075639\CA0\Civil\Eng\delivered\c-06.200-04\_SWM-POST.dwg  
Pn, Nov 20 2020 11:33:14pm

E

D

C

B

A

### Summary for Subcatchment BT: UNDETAINED

Runoff = 1.64 cfs @ 11.96 hrs, Volume= 0.079 af, Depth= 1.90"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.03 hrs  
Type II 24-hr 1 year Rainfall=2.53"

Area (ac)	CN	Description
0.120	80	>75% Grass cover, Good, HSG D
0.380	98	Paved parking, HSG D
0.500	94	Weighted Average
0.120		24.00% Pervious Area
0.380		76.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	50	0.0100	0.89		<b>Sheet Flow, 1</b> Smooth surfaces n= 0.011 P2= 3.05"
0.1	25	0.0200	2.87		<b>Shallow Concentrated Flow, 2</b> Paved Kv= 20.3 fps
0.1	60	0.0600	12.89	15.82	<b>Pipe Channel, 3</b> 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
1.1	135				Total, Increased to minimum Tc = 5.0 min

### Summary for Subcatchment 1A: SITE

Runoff = 6.76 cfs @ 11.98 hrs, Volume= 0.350 af, Depth= 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.03 hrs  
Type II 24-hr 1 year Rainfall=2.53"

Area (ac)	CN	Description
0.280	80	>75% Grass cover, Good, HSG D
1.740	98	Paved parking, HSG D
0.090	79	Woods/grass comb., Good, HSG D
2.110	95	Weighted Average
0.370		17.54% Pervious Area
1.740		82.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.9	17	0.0130	0.10		<b>Sheet Flow, P-A-1</b> Grass: Short n= 0.150 P2= 3.05"
1.7	217	0.0110	2.13		<b>Shallow Concentrated Flow, P-A-2</b> Paved Kv= 20.3 fps
1.6	362	0.0050	3.72	4.57	<b>Pipe Channel, P-A-3</b> 15.0" Round Area= 1.2 sf Perim= 3.9' r= 0.31' n= 0.013
0.5	60	0.0150	2.13	7.23	<b>Channel Flow, P-A-4</b> Area= 3.4 sf Perim= 16.4' r= 0.21' n= 0.030
6.7	656				Total

2828 SF OF SHEET FLOW  
NOT SUBJECT TO 1-YR ENERGY  
BALANCE CALCULATIONS

338 SF OF SHEET FLOW  
NOT SUBJECT TO 1-YR ENERGY  
BALANCE CALCULATIONS

1886 SF OF SHEET FLOW  
NOT SUBJECT TO 1-YR ENERGY  
BALANCE CALCULATIONS

### SWM LEGEND

	POST-DEVELOPMENT TURF (TO BIO)	0.28 AC
	POST-DEVELOPMENT IMPERVIOUS (TO BIO)	1.74 AC
	POST-DEVELOPMENT OPEN SPACE	0.09 AC
	POST-DEVELOPMENT BYPASS TURF	0.12 AC
	POST-DEVELOPMENT BYPASS IMPERVIOUS	0.38 AC

TOTAL POST DEV. AREA INCLUDED  
IN ENERGY BALANCE CALCULATION= 2.61 AC

\*POST-DEVELOPMENT  
IMPERVIOUS SHEET FLOW NOT  
SUBJECT TO 1-YR ENERGY  
BALANCE CALCULATIONS 0.12 AC

\*PER 9VAC-25-870-66 PART D & COV 62.1-44.15:34  
If Pre-development runoff conditions include sheet flow, and sheet flow can be maintained in the proposed development condition, stormwater quantity regulations will be satisfied demonstrating no adverse effect on downstream properties. Areas hatched here-in as sheet flow, are areas for which pavement section will have to be removed and then be repaved, however their conditions will not have adverse effects as original grades will not be altered in the repaving of these areas. These areas were therefore not included in 1-Yr Energy balance calculations, nor adequate outfall calculations.



Dewberry Engineers, Inc

1503 Edwards Ferry Road  
Suite 200  
Leesburg, VA 22186-6680  
703.827.5004

Ehlert Bryan

8609 Westwood Center Drive  
Suite 800  
Tysons, VA 22182  
703.827.9552

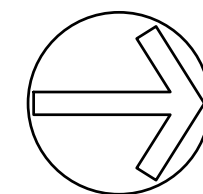
Mueller Associates, Inc.

1306 Concourse Dr  
Suite 100  
Linthicum, Maryland 21090  
410.646.4500

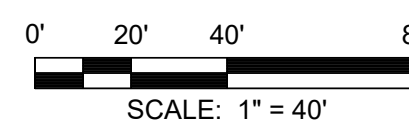
DULLES NORTH  
TRANSIT CENTER  
RELOCATION  
SITE PLAN  
DULLES ELECTION DISTRICT  
LOUDOUN COUNTY, VIRGINIA

SEAL

KEY PLAN



SCALE



REVISIONS

NO.	DESCRIPTION	DATE
3	ADDENDUM 4	12/3/20
2	ADDENDUM 2	11/4/20
1	ADDENDUM 1	11/4/20
0	PERMIT SET	9/21/20

DRAWN BY EL JS

APPROVED BY DT

CHECKED BY LR

DATE DECEMBER, 2020

TITLE

1-YR ENERGY  
BALANCE POST  
DEVELOPMENT  
AREAS

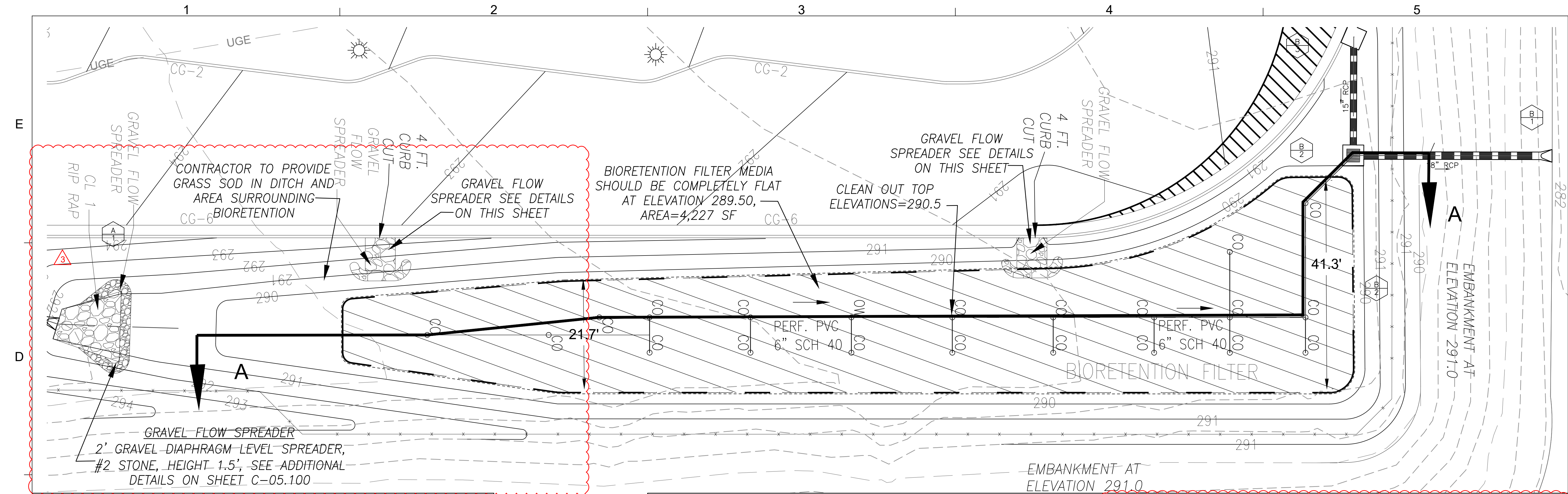
PROJECT NO.

C-06.200

SHEET NO.

OF

\\nyrmedown\projects\50075639\CAV\CAV\Eng\delivered\CAV-C-06-200-04\_SWM-POST.dwg  
Pn, Nov 20 2020 11:33:30pm



SCALE: 1" = 10'

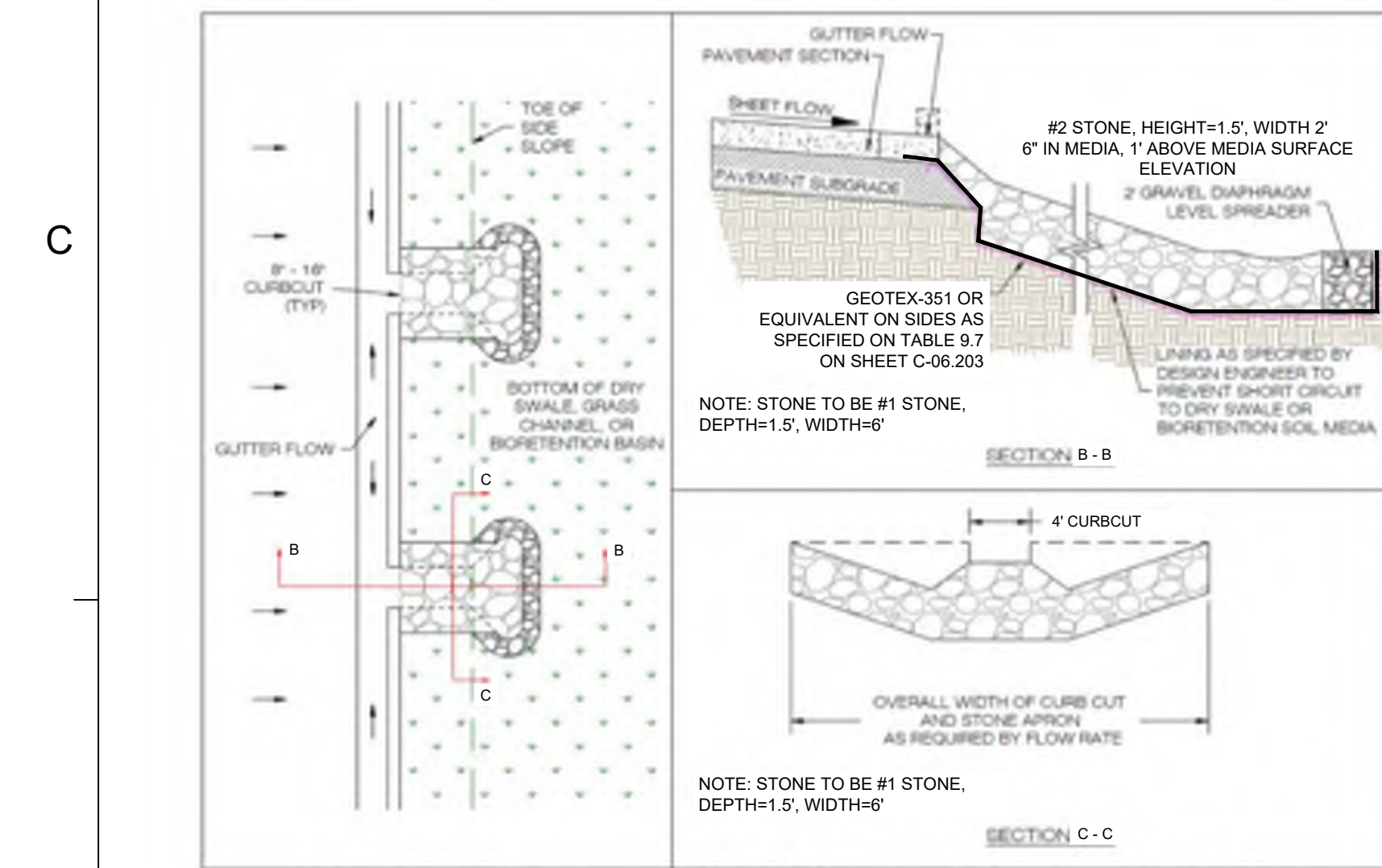


Figure 9.9: Pre-Treatment - Gravel Flow Spreader for Concentrated Flow

GRAVEL FLOW SPREADER AT BIORETENTIONS

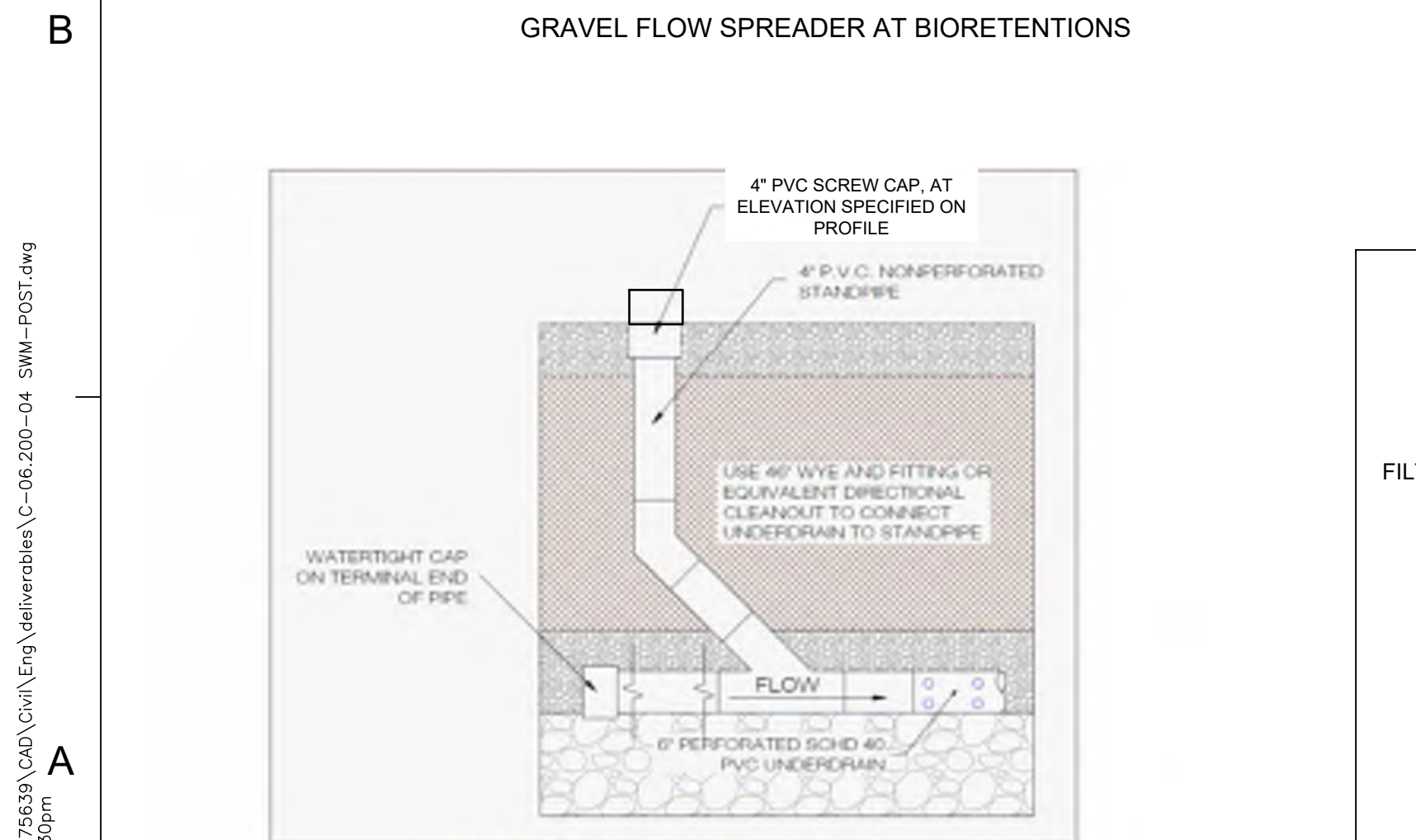
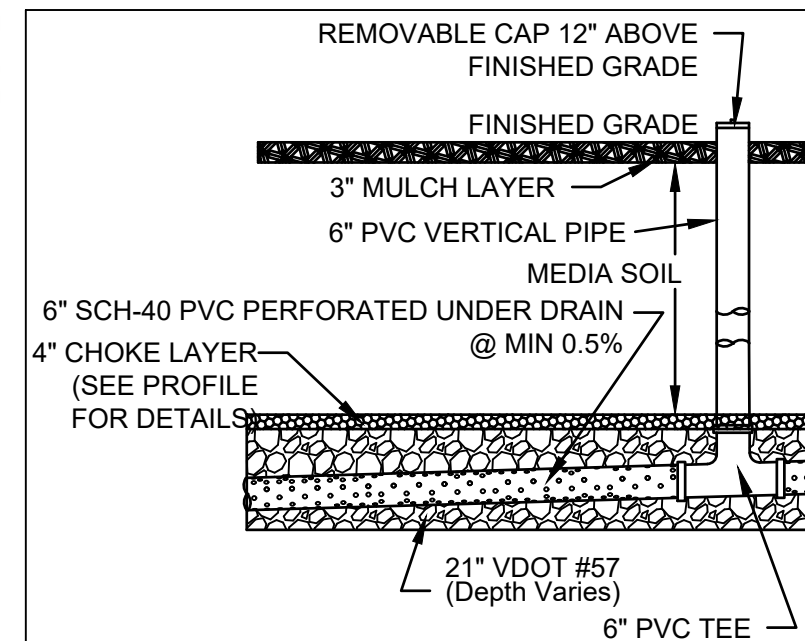


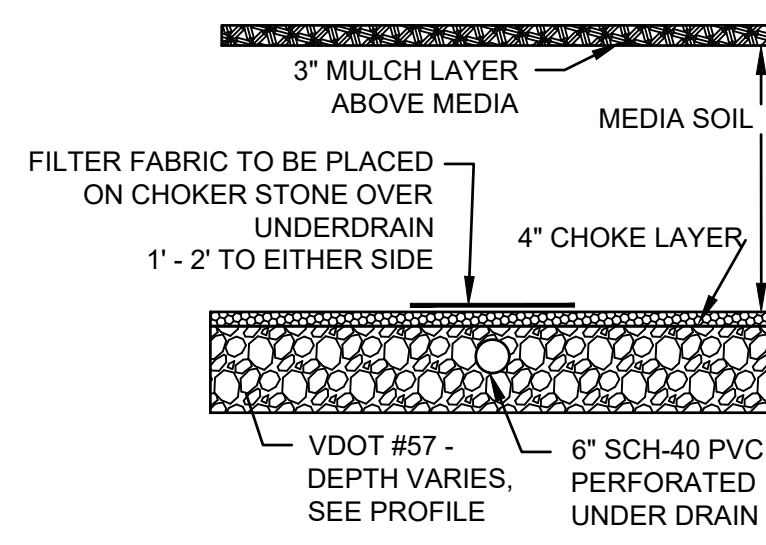
Figure 9-B.1: 4" P.V.C. Cleanout Detail

NOTE: ALL BIORETENTION BASINS SHOULD INCLUDE OBSERVATIONS WELLS. THE OBSERVATIONS WELLS SHOULD BE TIED INTO ANY T's OR Y's IN THE UNDERDRAIN SYSTEM AND SHOULD EXTEND UPWARDS TO BE FLUSH WITH THE SURFACE WITH A VENTED CAP. SEE SECTION 6.7 OF VA DCR STOMRWATER DESIGN SPECIFICATION NO. 9 - BIORETENTION



### OBSERVATION WELL DETAIL

Not to Scale



### GEOTEXTILE LINER OVER UNDERDRAIN

Not to Scale

STAGE-STORAGE CALCULATIONS BIORETENTION BASIN $V = b/3 * [A1 + A2 + \text{SQRT}(A1 * A2)]$							
Area (sq. ft.)	Elevation (ft.)	Media	Void Ratio	Area (acres)	Incr. Depth (ft.)	Incr. Volume (acre-ft.)	TOTAL VOLUME (cu ft.)
2073	282.50	Gravel	0.00	0.05	0.00	0.000	0.0000
3121	285.00	Gravel	0.40	0.07	2.50	0.059	2578.2*
3409	285.67	Gravel	0.40	0.08	0.67	0.013	0.0718
3552	286.00	Filter Media	0.25	0.08	0.33	0.007	0.0784
4434	288.00	Filter Media	0.25	0.10	2.00	0.046	0.1241
5115	289.50	Filter Media	0.25	0.12	1.50	0.164	0.2684
6258	290.00	Open	1.00	0.14	0.50	0.056	0.3439
8482	291.00	Open	1.00	0.19	1.00	0.146	0.4897

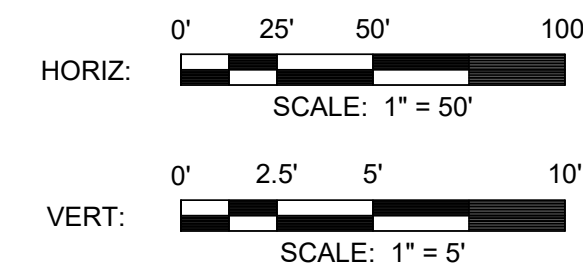
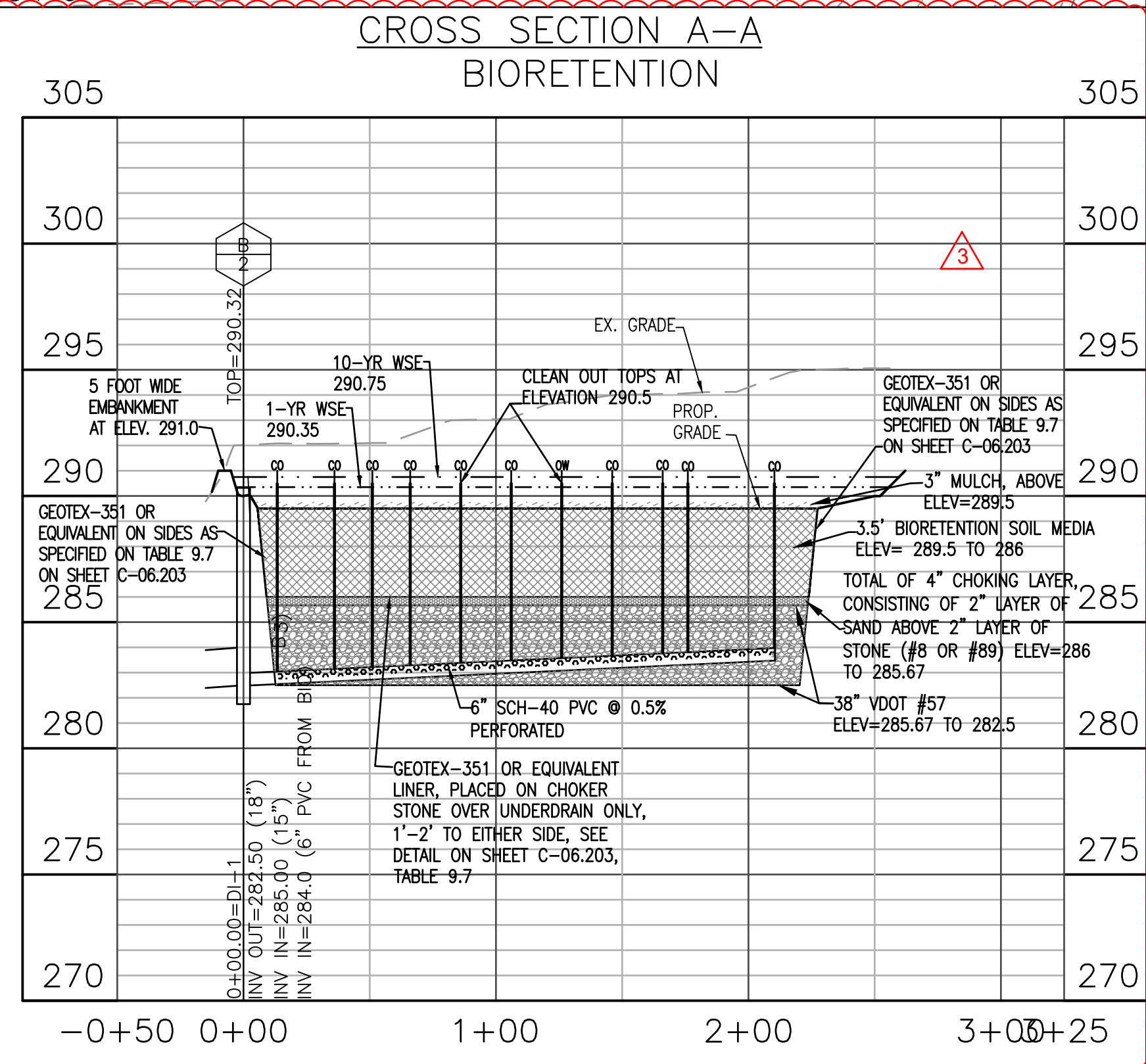
No. of valid row entries = 8  
\*Incremental Volume includes 40% void space within the gravel layer.  
\*\*Incremental Volume includes 25% void space within the engineered soil mix.

BIORETENTION BASIN Treatment Requirements	
BMP Type: Bioretention	
Level:	2
Proposed Drainage Area:	2.11 acres
Impermeable:	1.74 acres
Managed Turf:	0.28 acres
Wooded:	0.09 acres
Weighted Rv:	0.82
Required Tv:	0.18 ac-ft
Required Tv:	7839 cu. ft.
Required SA:	3612 sq. ft.
Provided SA:	5115
Provided Tv:	12581.13** cu. ft.
** Taken from stage-storage without ponding depth	
LEVEL 2 BIO-BASIN	
Tv = $1 / ((1.25 \text{ in } (Rv/A)) / 12)$	
Tv (cf) = Tv * 43560	
SA (sf) = Tv / 2.17 ft.	
Storage Depth = $(3.5' * 0.25) + (2' * 0.4) + (0.5' * 1)$	
Storage Depth = 2.17 ft.	

### VA DCR STORMWATER DESIGN SPECIFICATION NO. 9

### BIORETENTION

Table 9.8. Suggested Annual Maintenance Activities for Bioretention	
Maintenance Tasks	Frequency
• Mowing of grass filter strips and bioretention turf cover	At least 4 times a year
• Spot weeding, erosion repair, trash removal, and mulch raking	Twice during growing season
• Add reinforcement planting to maintain desired the vegetation density	As needed
• Remove invasive plants using recommended control methods	As needed
• Stabilize the contributing drainage area to prevent erosion	As needed
• Spring inspection and cleanup	Annually
• Supplement mulch to maintain a 3 inch layer	Annually
• Prune trees and shrubs	Annually
• Remove sediment in pre-treatment cells and inflow points	Once every 2 to 3 years
• Replace the mulch layer	Every 3 years



NOTE: CONSTRUCTION INSPECTIONS MUST BE CONDUCTED IN ACCORDANCE WITH MWAA ANNUAL STANDARDS AND SPECIFICATION FOR STORMWATER MANAGEMENT AND EROSION AND SEDIMENT CONTROL. INSPECTION CHECKLIST MUST BE KEPT IN THE PROJECT SWPPP.

SWM FACILITY CONSTRUCTION INSPECTION CHECKLIST AND CERTIFICATION FORM FOR BIORETENTION IN THE MWAA AS&S APPENDIX H BMP CLEARINGHOUSE CONSTRUCTION/INSPECTION/CERTIFICATION FORM MUST BE PROVIDED TO MWAA FOR FINAL APPROVAL FOLLOWING FINAL INSPECTION

Dewberry Engineers, Inc.  
1503 Edwards Ferry Road  
Suite 200  
Leesburg, VA 20176-6680  
703.771.5004

Ehlert Bryan  
8609 Westwood Center Drive  
Suite 800  
Tysons, VA 22182  
703.827.9552

Muehle Associates, Inc.  
3906 Concourse Dr.  
Suite 100  
Lithium, Maryland 21090  
410.646.4500

## DULLES NORTH TRANSIT CENTER RELOCATION SITE PLAN

DULLES ELECTON DISTRICT  
LOUDOUN COUNTY, VIRGINIA

SEAL

KEY PLAN

SCALE

AS NOTED

REVISIONS

NO.	DESCRIPTION	DATE
3	ADDENDUM 4	12/3/20
2	ADDENDUM 2	11/4/20
1	ADDENDUM 1	11/4/20
0	PERMIT SET	9/21/20

DRAWN BY EL JS

APPROVED BY DT

CHECKED BY LR

DATE DECEMBER, 2020

TITLE

## BIORETENTION BASIN DETAILS

PROJECT NO.

# C-06-201

SHEET NO. OF

\\tycomedown\projects\50075639\CAD\Civil\Eng\delivered\BIO-C-06.200-04\_SWM-POST.dwg  
P1, Nov 20 2020 = 1:34:7pm

E

D

C

B

A

## BIORETENTION BASIN

1-YEAR STORM EVENT ROUTINGS

### OUTFALL-1-TRANSIT CENTER-REV1

Prepared by DEWBERRY  
HydroCAD® 10.00-19 s/n 09482 © 2016 HydroCAD Software Solutions LLC

Type II 24-hr 1 year Rainfall=2.53"

Printed 11/17/2020  
Page 1

#### Summary for Pond Bio-1: BIO-1

Inflow Area = 2.110 ac, 82.46% Impervious, Inflow Depth = 1.99" for 1 year event  
Inflow = 6.76 cfs @ 11.98 hrs, Volume= 0.350 af  
Outflow = 0.12 cfs @ 15.96 hrs, Volume= 0.064 af, Atten= 98%, Lag= 239.2 min  
Primary = 0.12 cfs @ 15.96 hrs, Volume= 0.064 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.03 hrs  
Peak Elev= 290.35' @ 15.96 hrs Surf.Area= 6,945 sf Storage= 12,677 cf

Plug-Flow detention time= 558.8 min calculated for 0.064 af (18% of inflow)  
Center-of-Mass det. time= 372.4 min ( 1,158.3 - 785.9 )

Volume	Invert	Avail.Storage	Storage	Description
#1	282.50'	17,697 cf		Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
282.50	2,073	0.0	0	0
283.50	2,489	40.0	912	912
285.00	3,121	40.0	1,683	2,595
285.67	3,409	40.0	875	3,470
286.00	3,552	25.0	287	3,758
288.00	4,434	25.0	1,997	5,754
289.50	5,115	25.0	1,790	7,544
290.00	6,258	100.0	2,843	10,388
290.50	7,248	100.0	3,377	13,764
291.00	8,482	100.0	3,933	17,697

Device	Routing	Invert	Outlet Devices
#1	Primary	282.50'	18.0" Round Culvert L= 35.4' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 282.50' / 282.25' S= 0.0071' /' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf
#2	Device 1	290.32'	26.0" x 26.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

### OUTFALL-1-TRANSIT CENTER-REV1

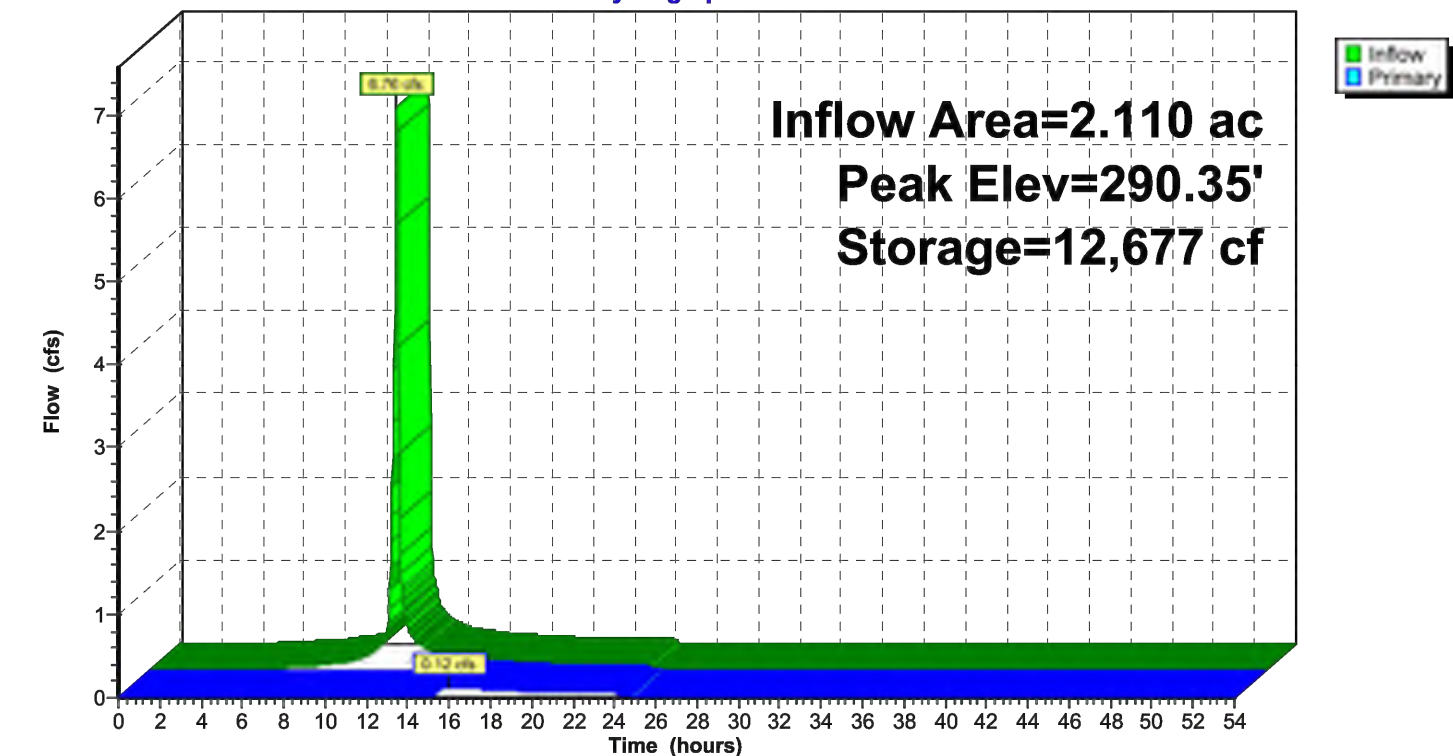
Prepared by DEWBERRY  
HydroCAD® 10.00-19 s/n 09482 © 2016 HydroCAD Software Solutions LLC

Type II 24-hr 1 year Rainfall=2.53"

Printed 11/17/2020  
Page 2

#### Pond Bio-1: BIO-1

Hydrograph



### OUTFALL-1-TRANSIT CENTER-REV1

Prepared by DEWBERRY  
HydroCAD® 10.00-19 s/n 09482 © 2016 HydroCAD Software Solutions LLC

Type II 24-hr 1 year Rainfall=2.53"

Printed 11/17/2020  
Page 3

#### Hydrograph for Pond Bio-1: BIO-1

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	282.50	0.00
1.50	0.00	0	282.50	0.00
3.00	0.00	0	282.50	0.00
4.50	0.01	13	282.52	0.00
6.00	0.03	106	282.63	0.00
7.50	0.05	304	282.85	0.00
9.00	0.09	652	283.23	0.00
10.50	0.18	1,311	283.89	0.00
12.00	0.47	2,208	289.23	0.00
13.50	0.26	11,421	290.16	0.00
15.00	0.16	12,465	290.32	0.00
16.50	0.11	12,670	290.35	0.12
18.00	0.09	12,650	290.34	0.10
19.50	0.08	12,629	290.34	0.08
21.00	0.07	12,614	290.34	0.07
22.50	0.06	12,609	290.34	0.06
24.00	0.06	12,604	290.34	0.06
25.50	0.00	12,513	290.32	0.00
27.00	0.00	12,500	290.32	0.00
28.50	0.00	12,498	290.32	0.00
30.00	0.00	12,494	290.32	0.00
31.50	0.00	12,493	290.32	0.00
33.00	0.00	12,493	290.32	0.00
34.50	0.00	12,493	290.32	0.00
36.00	0.00	12,492	290.32	0.00
37.50	0.00	12,492	290.32	0.00
39.00	0.00	12,492	290.32	0.00
40.50	0.00	12,492	290.32	0.00
42.00	0.00	12,492	290.32	0.00
43.50	0.00	12,492	290.32	0.00
45.00	0.00	12,492	290.32	0.00
46.50	0.00	12,492	290.32	0.00
48.00	0.00	12,492	290.32	0.00
49.50	0.00	12,492	290.32	0.00
51.00	0.00	12,492	290.32	0.00
52.50	0.00	12,492	290.32	0.00
54.00	0.00	12,492	290.32	0.00

## OUTFALL 1

### 1-YEAR STORM EVENT-PRE DEVELOPMENT ROUTING

### OUTFALL-1-TRANSIT CENTER

Prepared by DEWBERRY  
HydroCAD® 10.00-19 s/n 09482 © 2016 HydroCAD Software Solutions LLC

Type II 24-hr 1 year Rainfall=2.53"

Printed 4/7/2020  
Page 1

#### Summary for Subcatchment PD: PRE-DEV

Runoff = 3.53 cfs @ 12.06 hrs, Volume= 0.222 af, Depth= 1.02"

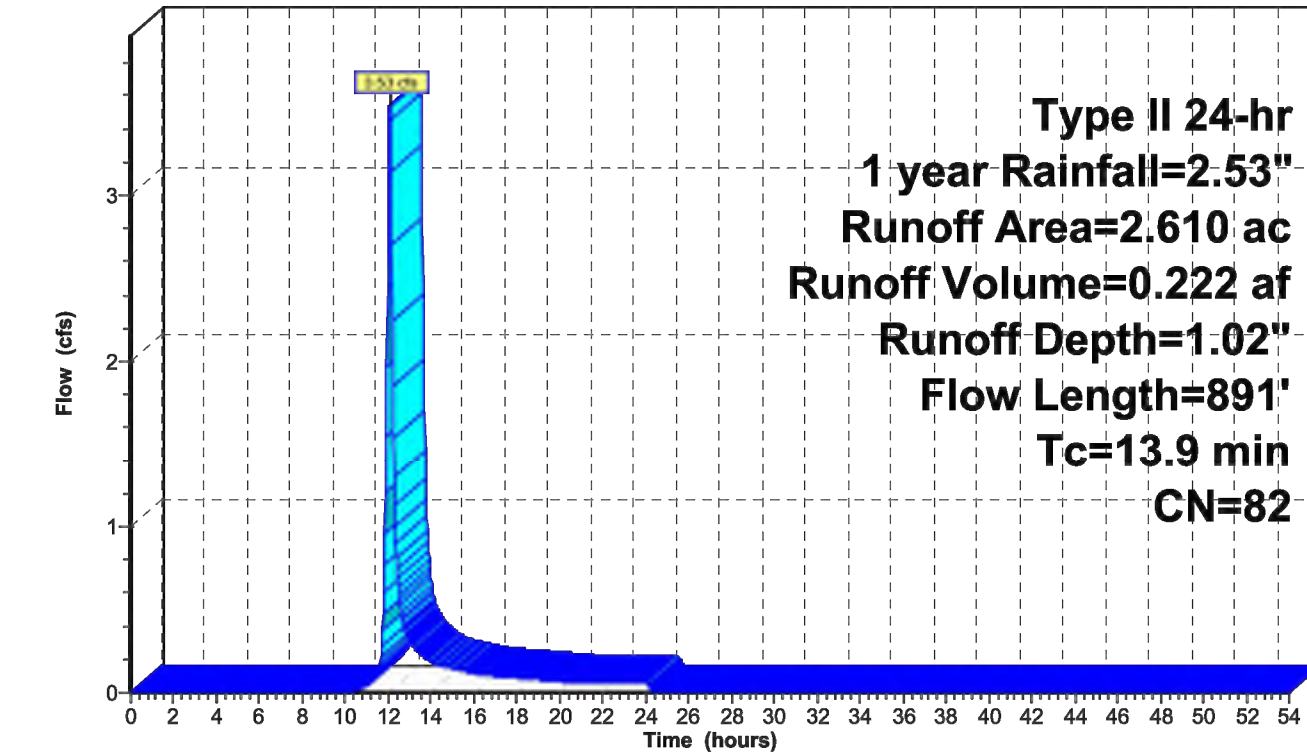
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.03 hrs  
Type II 24-hr 1 year Rainfall=2.53"

Area (ac)	CN	Description
2.290	80	>75% Grass cover, Good, HSG D
0.320	98	Paved parking, HSG D
2.610	82	Weighted Average
2.290		87.74% Pervious Area
0.320		12.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.0160	0.13		Sheet Flow, E-1 Grass: Short n= 0.150 P2= 3.05"
7.5	796	0.0122	1.78		Shallow Concentrated Flow, E-2 Unpaved Kv= 16.1 fps
0.1	45	0.3300	9.25		Shallow Concentrated Flow, E-3 Unpaved Kv= 16.1 fps
13.9	891	Total			

#### Subcatchment PD: PRE-DEV

Hydrograph



### 1-YR ENERGY BALANCE-OUTFALL NARRATIVE

#### PROJECT DESCRIPTION

THE IMPROVEMENTS PROPOSED WITH THIS PLAN ARE PART OF A PREVIOUSLY APPROVED PLAN CALLED "WASHINGTON DULLES INTERNATIONAL AIRPORT, REMOTE EMPLOYEE PARKING PHASE 2". THE IMPROVEMENTS PROPOSED WITH THIS PLAN ARE THEREFORE CONSIDERED A RE-DEVELOPMENT. THE STUDY AREA FOR OUTFALL 1 TOTALS 2.61 ACRES (2.11 AC TO BIORETENTION BASIN, AND 0.50 AC OF UNDETAINE BYPASS). THE AREA OF PROPOSED IMPROVEMENTS, 2.61 ACRES, HAS BEEN MANAGED FOR WATER QUALITY AND QUANTITY IN ACCORDANCE WITH TECHNICAL CRITERIA SET FORTH IN THE VIRGINIA STORMWATER MANAGEMENT PROGRAM PERMIT REGULATIONS (9VAC25-870-10 et seq.). NON-PROPRIETARY BMP'S HAVE BEEN DESIGNED TO MEET SPECIFICATIONS OUTLINED IN THE VIRGINIA DEQ 2013 STORMWATER BMP CLEARINGHOUSE STANDARDS AND SPECIFICATIONS. REFER TO BMP NARRATIVE ON SHEET C.07.203 FOR THIS PROJECT. THE CALCULATIONS SHOWN ON THIS SHEET AND REFERENCED ON THIS NARRATIVE RELATE ONLY TO THE 1-YR ENERGY BALANCE REQUIREMENT, FOR ADEQUATE OUTFALL RELATING TO THE THE 2-YR AND 10-YR STORM EVENTS SEE SHEETS C.06.204 & C.06.205.

#### 1YR-ENERGY BALANCE NARRATIVE

THE BIORETENTION PROPOSED ON THIS PROJECT HAS BEEN DESIGNED TO CAPTURE RUNOFF FROM 2.11 RE-DEVELOPED ACRES AND DISCHARGE INTO EXISTING CONCRETE OUTFALL CHANNEL. THE RUNOFF IS ATTENUATED SUCH THAT THE TOTAL 1 YEAR RELEASE RATE FROM THE BIORETENTION BASIN AND UNDETAINE AREA MEET THE DISCHARGE REQUIRED BY ENERGY BALANCE METHODOLOGY FOR THE 2.61 ACRE STUDY AREA. SINCE THE DRAINAGE AREA IS OVER 1 ACRE AN IMPROVEMENT FACTOR OF 0.8 WAS USED IN THE ENERGY BALANCE CALCULATIONS. (SEE THIS SHEET FOR ENERGY BALANCE CALCULATIONS)

THE CALCULATED PRE-DEVELOPMENT 1-YEAR FLOW GENERATED FROM THE STUDY AREA TO THE EXISTING CONCRETE CHANNEL IS 3.53 CFS, SEE SHEET C.06.100 FOR PRE-DEVELOPMENT AREAS, CN & TC CALCULATIONS. SEE SHEET C-06.202 FOR PRE-DEVELOPMENT ROUTING CALCULATIONS.

THE POST-DEVELOPMENT, COMBINED UNDETAINE AND DETAINE AREAS TOTAL 2.61 AC; SEE SHEET C-06.200 FOR PROPOSED AREAS, ADJUSTED CN & TC CALCULATIONS. THE FINAL CALCULATED 1-YEAR FLOW DISCHARGED FROM THE PROPOSED DEVELOPMENT IS 1.64 CFS, SEE SHEET C.06.205 FOR ROUTING CALCULATIONS. SINCE THE DEVELOPED DISCHARGE OF 1.64 CFS IS EQUAL OR LESS THAN THE CALCULATED ALLOWABLE RATE OF 1.81 CFS, THE REQUIREMENT OF THE ENERGY BALANCE METHODOLOGY IS MET, SEE SHEET C.06.205.

SINCE OUTFALL 1 DISCHARGES MEET THE 1-YEAR ENERGY BALANCE (SHEET C.06.205), WE BELIEVE THAT ADEQUATE STORMWATER MANAGEMENT AND ADEQUATE OUTFALL FOR THIS DRAINAGE AREA HAS BEEN PROVIDED WITH THE PROPOSED IMPROVEMENTS.

NOTE: SOILS ARE NOT DEFINED IN THE LOUDOUN COUNTY INTERPRETIVE GUIDE TO THE USE OF SOIL MAPS. SOIL TYPE 'D' IS ASSUMED FOR ALL CALCULATIONS. SEE GEOTECHNICAL REPORT SUBMITTED BY TERRACON: Geotechnical Engineering Report, Dulles North Park and Ride, Sterling, Virginia. June 23, 2020. Terracon Project No. JD205034

3

## OUTFALL 1

### 1-YEAR STORM EVENT-POST DEVELOPMENT ROUTING

### OUTFALL-1-TRANSIT CENTER-REV1

Prepared by DEWBERRY  
HydroCAD® 10.00-19 s/n 09482 © 2016 HydroCAD Software Solutions LLC

Type II 24-hr 1 year Rainfall=2.53"

Printed 11/16/2020  
Page 1

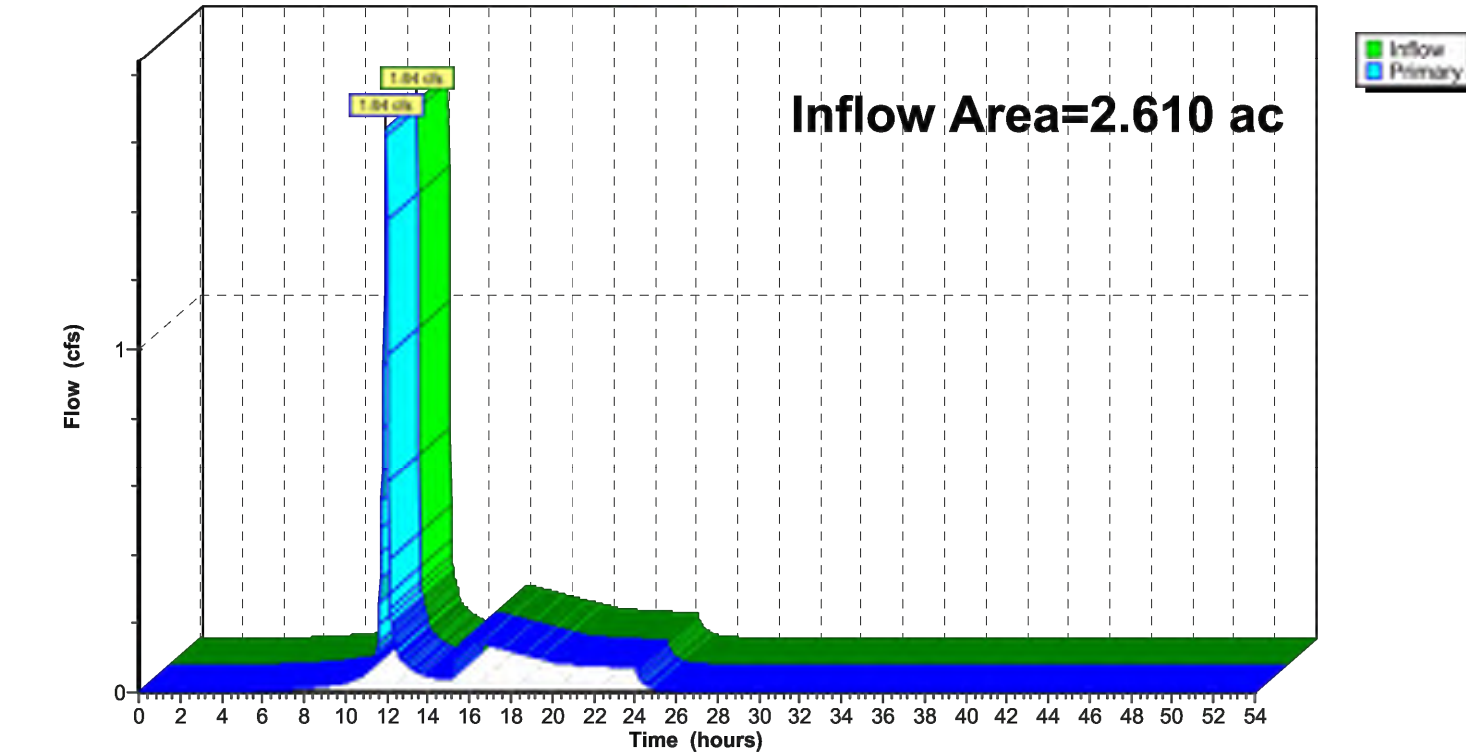
#### Summary for Link O-1: OUTFALL-1

Inflow Area = 2.610 ac, 81.23% Impervious, Inflow Depth = 0.66" for 1 year event  
Inflow = 1.64 cfs @ 11.96 hrs, Volume= 0.143 af  
Primary = 1.64 cfs @ 11.96 hrs, Volume= 0.143 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-54.00 hrs, dt= 0.03 hrs

#### Link O-1: OUTFALL-1

Hydrograph



### OUTFALL-1-TRANSIT CENTER-REV1

Prepared by DEWBERRY  
HydroCAD® 10.00-19 s/n 09482 © 2016 HydroCAD Software Solutions LLC

Type II 24-hr 1 year Rainfall=2.53"

Printed 11/16/2020  
Page 2

#### Hydrograph for Link O-1: OUTFALL-1

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	31.20	0.00	0.00	0.00
0.60	0.00	0.00	0.00	31.80	0.00	0.00	0.00
1.20	0.00	0.00	0.00	32.40	0.00	0.00	0.00
1.80	0.00	0.00	0.00	33.00	0.00	0.00	0.00
2.40	0.00	0.00	0.00	33.60	0.00	0.00	0.00
3.00	0.00	0.00	0.00	34.20	0.00	0.00	0.00
3.60	0.00	0.00	0.00	34.80	0.00	0.00	0.00
4.20	0.00	0.00	0.00	35.40	0.00	0.00	0.00
4.80	0.00	0.00	0.00	36.00	0.00	0.00	0.00
5.40	0.00	0.00	0.00	36.60	0.00	0.00	0.00
6.00	0.00	0.00	0.00	37.20	0.00	0.00	0.00
6.60	0.01	0.00	0.01	37.80	0.00	0.00	0.00
7.20	0.01	0.00	0.01	38.40	0.00	0.00	0.00
7.80	0.01	0.00	0.01	39.00	0.00	0.00	0.00
8.40	0.01	0.00	0.01	39.60	0.00	0.00	0.00
9.00	0.02	0.00	0.02	40.20	0.00	0.00	0.00
9.60	0.02	0.00	0.02	40.80	0.00	0.00	0.00
10.20	0.03	0.00	0.03	41.40	0.00	0.00	0.00
10.80	0.05	0.00	0.05	42.00	0.00	0.00	0.00
11.40	0.09	0.00	0.09	42.60	0.00	0.00	0.00
12.00	1.38	0.00	1.38	43.20	0.00	0.00	0.00
12.60	0.10	0.00	0.10	43.80	0.00	0.00	0.00
13.20	0.07	0.00	0.07	44.40	0.00	0.00	0.00
13.80	0.05	0.00	0.05	45.00	0.00	0.00	0.00
14.40	0.04	0.00	0.04	45.60	0.00	0.00	0.00
15.00	0.04	0.00	0.04	46.20	0.00	0.00	0.00
15.60	0.14	0.00	0.14	46.80	0.00	0.00	0.00
16.20	0.15	0.00	0.15	47.40	0.00	0.00	0.00
16.80	0.14	0.00	0.14	48.00	0.00	0.00	0.00
17.40	0.13	0.00	0.13	48.60	0.00	0.00	0.00
18.00	0.12	0.00	0.12	49.20	0.00	0.00	0.00
18.60	0.11	0.00	0.11	49.80	0.00	0.00	0.00
19.20	0.10	0.00	0.10	50.40	0.00	0.00	0.00
19.80	0.09	0.00	0.09	51.00	0.00	0.00	0.00
20.40	0.08	0.00	0.08	51.60	0.00	0.00	0.00
21.00	0.08	0.00	0.08	52.20	0.00	0.00	0.00
21.60	0.08	0.00	0.08	52.80	0.00	0.00	0.00
22.20	0.08	0.00	0.08	53.40	0.00	0.00	0.00
22.80	0.08	0.00	0.08	54.00	0.00	0.00	0.00
23.40	0.07	0.00	0.07				
24.00	0.07	0.00	0.07				
24.60	0.02	0.00	0.02				
25.20	0.01	0.00	0.01				
25.80	0.00	0.00	0.00				
26.40	0.00	0.00	0.00				
27.00	0.00	0.00	0.00				
27.60	0.00	0.00	0.00				
28.20	0.00	0.00	0.00				
28.80	0.00	0.00	0.00				
29.40	0.00	0.00	0.00				
30.00	0.00	0.00	0.00				
30.60	0.00	0.00	0.00				

#### CHANNEL PROTECTION - 1 YEAR ENERGY BALANCE

##### OUTFALL 1

STORM	P (inches)	I.F.	PRE-DEVELOPED CONDITIONS						DEVELOPED CONDITIONS						S <sub></sub>
-------	------------	------	--------------------------	--	--	--	--	--	----------------------	--	--	--	--	--	---------------

1 PRE-DEVELOPMENT  
10-YEAR STORM EVENT ROUTINGS

**OUTFALL-1-TRANSIT CENTER-REV1** Type II 24-hr 10 year Rainfall=4.61"  
Prepared by DEWBERRY Printed 11/16/2020  
HydroCAD® 10.00-19 s/n 09482 © 2016 HydroCAD Software Solutions LLC Page 1

**Summary for Subcatchment PD: PRE-DEV**

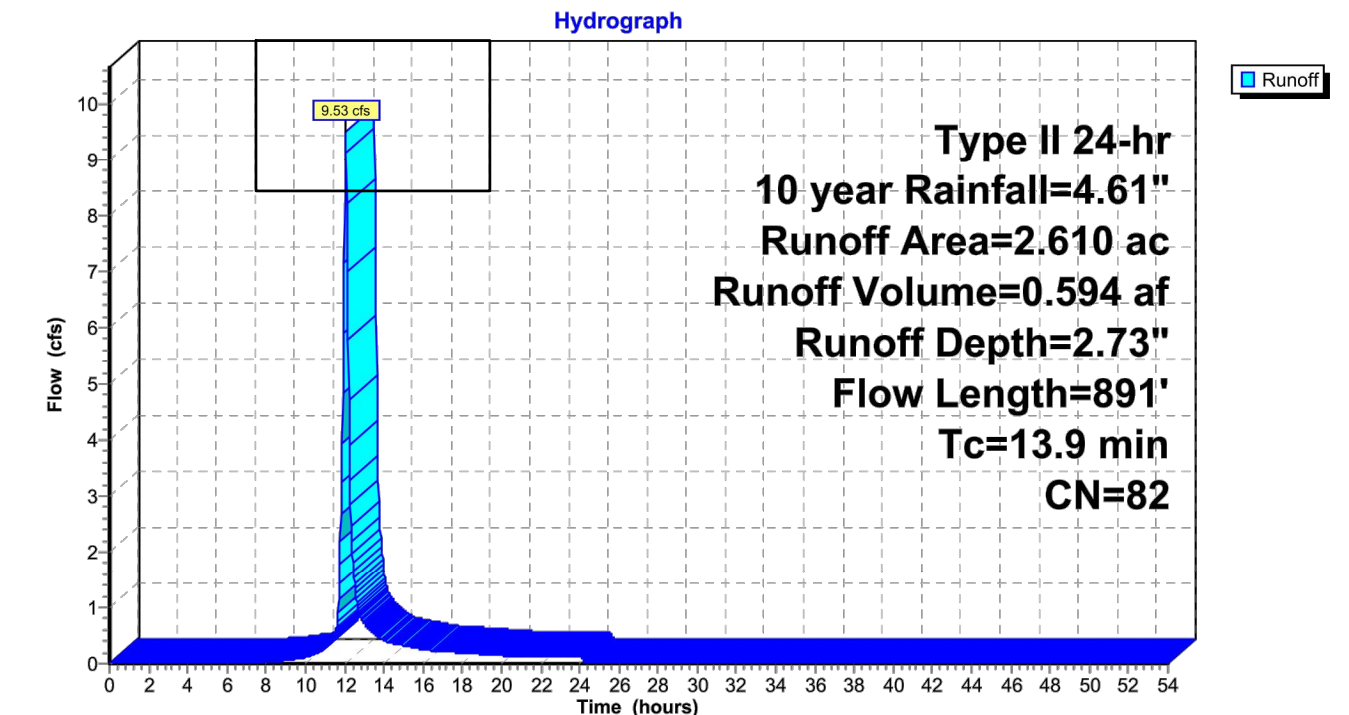
Runoff = 9.53 cfs @ 12.06 hrs, Volume= 0.594 af, Depth= 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.03 hrs  
Type II 24-hr 10 year Rainfall=4.61"

Area (ac)	CN	Description
2.290	80	>75% Grass cover, Good, HSG D
0.320	98	Paved parking, HSG D
2.610	82	Weighted Average
2.290		87.74% Pervious Area
0.320		12.26% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.3	50	0.0160	0.13		Sheet Flow, E-1
					Grass: Short n= 0.150 P2= 3.05"
7.5	796	0.0122	1.78		Shallow Concentrated Flow, E-2
					Unpaved Kv= 16.1 fps
0.1	45	0.3300	9.25		Shallow Concentrated Flow, E-3
					Unpaved Kv= 16.1 fps
13.9	891	Total			

**Subcatchment PD: PRE-DEV**



**OUTFALL-1-TRANSIT CENTER-REV1** Type II 24-hr 10 year Rainfall=4.61"  
Prepared by DEWBERRY Printed 11/16/2020  
HydroCAD® 10.00-19 s/n 09482 © 2016 HydroCAD Software Solutions LLC Page 2

**Hydrograph for Subcatchment PD: PRE-DEV**

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	31.20	4.61	2.73	0.00
0.60	0.03	0.00	0.00	31.80	4.61	2.73	0.00
1.20	0.06	0.00	0.00	32.40	4.61	2.73	0.00
1.80	0.09	0.00	0.00	33.00	4.61	2.73	0.00
2.40	0.12	0.00	0.00	33.60	4.61	2.73	0.00
3.00	0.16	0.00	0.00	34.20	4.61	2.73	0.00
3.60	0.20	0.00	0.00	34.80	4.61	2.73	0.00
4.20	0.23	0.00	0.00	35.40	4.61	2.73	0.00
4.80	0.28	0.00	0.00	36.00	4.61	2.73	0.00
5.40	0.32	0.00	0.00	36.60	4.61	2.73	0.00
6.00	0.37	0.00	0.00	37.20	4.61	2.73	0.00
6.60	0.42	0.00	0.00	37.80	4.61	2.73	0.00
7.20	0.48	0.00	0.00	38.40	4.61	2.73	0.00
7.80	0.53	0.00	0.02	39.00	4.61	2.73	0.00
8.40	0.60	0.01	0.03	39.60	4.61	2.73	0.00
9.00	0.68	0.02	0.06	40.20	4.61	2.73	0.00
9.60	0.77	0.04	0.09	40.80	4.61	2.73	0.00
10.20	0.87	0.07	0.14	41.40	4.61	2.73	0.00
10.80	1.02	0.12	0.24	42.00	4.61	2.73	0.00
11.40	1.25	0.22	0.47	42.60	4.61	2.73	0.00
12.00	3.06	1.42	8.36	43.20	4.61	2.73	0.00
12.60	3.43	1.72	1.16	43.80	4.61	2.73	0.00
13.20	3.61	1.88	0.63	44.40	4.61	2.73	0.00
13.80	3.74	1.99	0.46	45.00	4.61	2.73	0.00
14.40	3.85	2.07	0.37	45.60	4.61	2.73	0.00
15.00	3.93	2.15	0.32	46.20	4.61	2.73	0.00
15.60	4.01	2.21	0.28	46.80	4.61	2.73	0.00
16.20	4.08	2.27	0.24	47.40	4.61	2.73	0.00
16.80	4.14	2.32	0.22	48.00	4.61	2.73	0.00
17.40	4.19	2.37	0.21	48.60	4.61	2.73	0.00
18.00	4.25	2.41	0.19	49.20	4.61	2.73	0.00
18.60	4.29	2.46	0.18	49.80	4.61	2.73	0.00
19.20	4.34	2.49	0.16	50.40	4.61	2.73	0.00
19.80	4.38	2.53	0.15	51.00	4.61	2.73	0.00
20.40	4.41	2.56	0.14	51.60	4.61	2.73	0.00
21.00	4.45	2.59	0.13	52.20	4.61	2.73	0.00
21.60	4.48	2.62	0.13	52.80	4.61	2.73	0.00
22.20	4.51	2.65	0.13	53.40	4.61	2.73	0.00
22.80	4.55	2.68	0.12	54.00	4.61	2.73	0.00
23.40	4.58	2.71	0.12				
24.00	4.61	2.73	0.12				
24.60	4.61	2.73	0.00				
25.20	4.61	2.73	0.00				
25.80	4.61	2.73	0.00				
26.40	4.61	2.73	0.00				
27.00	4.61	2.73	0.00				
27.60	4.61	2.73	0.00				
28.20	4.61	2.73	0.00				
28.80	4.61	2.73	0.00				
29.40	4.61	2.73	0.00				
30.00	4.61	2.73	0.00				
30.60	4.61	2.73	0.00				

2 10-YEAR STORM EVENT-BIORETENTION ROUTING

**OUTFALL-1-TRANSIT CENTER-REV1** Type II 24-hr 10 year Rainfall=4.61"  
Prepared by DEWBERRY Printed 11/17/2020  
HydroCAD® 10.00-19 s/n 09482 © 2016 HydroCAD Software Solutions LLC Page 1

**Summary for Pond Bio-1: BIO-1**

Inflow Area = 2.110 ac, 82.46% Impervious, Inflow Depth = 4.03" for 10 year event  
Inflow = 13.07 cfs @ 11.97 hrs, Volume= 0.709 af  
Outflow = 7.95 cfs @ 12.06 hrs, Volume= 0.422 af, Atten= 39%, Lag= 5.1 min  
Primary = 7.95 cfs @ 12.06 hrs, Volume= 0.422 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.03 hrs  
Peak Elev= 290.75' @ 12.06 hrs Surf.Area= 7,862 sf Storage= 15,643 cf

Plug-Flow detention time= 212.5 min calculated for 0.422 af (60% of inflow)  
Center-of-Mass det. time= 105.8 min ( 873.2 - 767.5 )

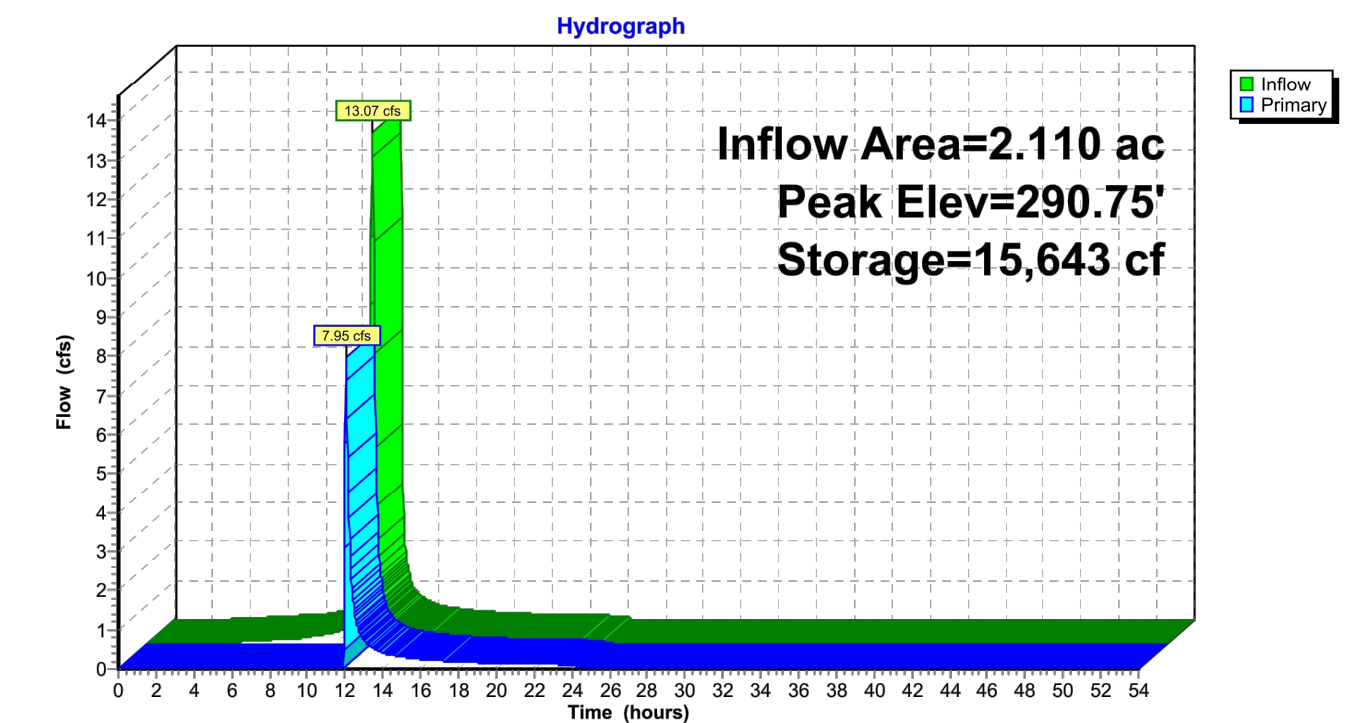
Volume	Invert	Avail. Storage	Storage Description	
#1	282.50'	17,697 cf	Custom Stage Data (Prismatic) Listed below (Recalc)	
Elevation (feet)	Surf. Area (sq-ft)	Voids (%)	Inc. Store (cubic-feet)	Cum. Store (cubic-feet)
282.50	2,073	0.0	0	0
283.50	2,489	40.0	912	912
285.00	3,121	40.0	1,683	2,595
285.67	3,409	40.0	875	3,470
286.00	3,552	25.0	287	3,758
288.00	4,434	25.0	1,997	5,754
289.50	5,115	25.0	1,790	7,544
290.00	6,258	100.0	2,843	10,388
290.50	7,248	100.0	3,377	13,764
291.00	8,482	100.0	3,933	17,697

Device	Routing	Invert	Outlet Devices
#1	Primary	282.50'	18.0" Round Culvert L= 35.4' RCP, rounded edge headwall, Ke= 0.100 Inlet / Outlet Invert= 282.50' / 282.25' S= 0.0071' /' Cc= 0.900 n= 0.013, Flow Area= 1.77 sf 26.0" x 26.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Device 1	290.32'	

Primary OutFlow Max=7.92 cfs @ 12.06 hrs HW=290.75' TW=0.00' (Dynamic Tailwater)  
1=Culvert (Passes 7.92 cfs of 28.38 cfs potential flow)  
2=Orifice/Grate (Weir Controls 7.92 cfs @ 2.14 fps)

**OUTFALL-1-TRANSIT CENTER-REV1** Type II 24-hr 10 year Rainfall=4.61"  
Prepared by DEWBERRY Printed 11/17/2020  
HydroCAD® 10.00-19 s/n 09482 © 2016 HydroCAD Software Solutions LLC Page 2

**Pond Bio-1: BIO-1**



**OUTFALL-1-TRANSIT CENTER-REV1** Type II 24-hr 10 year Rainfall=4.61"  
Prepared by DEWBERRY Printed 11/17/2020  
HydroCAD® 10.00-19 s/n 09482 © 2016 HydroCAD Software Solutions LLC Page 3

**Hydrograph for Pond Bio-1: BIO-1**

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	282.50	0.00
1.50	0.00	0	282.50	0.00
3.00	0.02	30	282.54	0.00
4.50	0.06	232	282.77	0.00
6.00	0.10	638	283.22	0.00
7.50	0.14	1,263	283.84	0.00
9.00	0.23	2,196	284.67	0.00
10.50	0.41	3,768	286.01	0.00
12.00	12.46	15,010	290.67	5.80
13.50	0.48	12,983	290.39	0.53
15.00	0.30	12,834	290.37	0.31
16.50	0.21	12,763	290.36	0.22
18.00	0.18	12,732	290.35	0.18
19.50	0.14	12,699	290.35	0.15
21.00	0.12	12,676	290.35	0.12
22.50	0.11	12,668	290.35	0.12
24.00	0.11	12,661	290.34	0.11
25.50	0.00	12,516	290.32	0.01
27.00	0.00	12,501	290.32	0.00
28.50	0.00	12,496	290.32	0.00
30.00	0.00	12,494	290.32	0.00
31.50	0.00	12,493	290.32	0.00
33.00	0.00	12,493	290.32	0.00
34.50	0.00	12,493	290.32	0.00
36.00	0.00	12,492	290.32	0.00
37.50	0.00	12,492	290.32	0.00
39.00	0.00	12,492	290.32	0.00
40.50	0.00	12,492	290.32	0.00
42.00	0.00	12,492	290.32	0.00
43.50	0.00	12,492	290.32	0.00
45.00	0.00	12,492	290.32	0.00
46.50	0.00	12,492	290.32	0.00
48.00	0.00	12,492	290.32	0.00
49.50	0.00	12,492	290.32	0.00
51.00	0.00	12,492	290.32	0.00
52.50	0.00	12,492	290.32	0.00
54.00	0.00	12,492	290.32	0.00

3 POST DEVELOPMENT  
10-YEAR STORM EVENT-POST DEVELOPMENT ROUTING

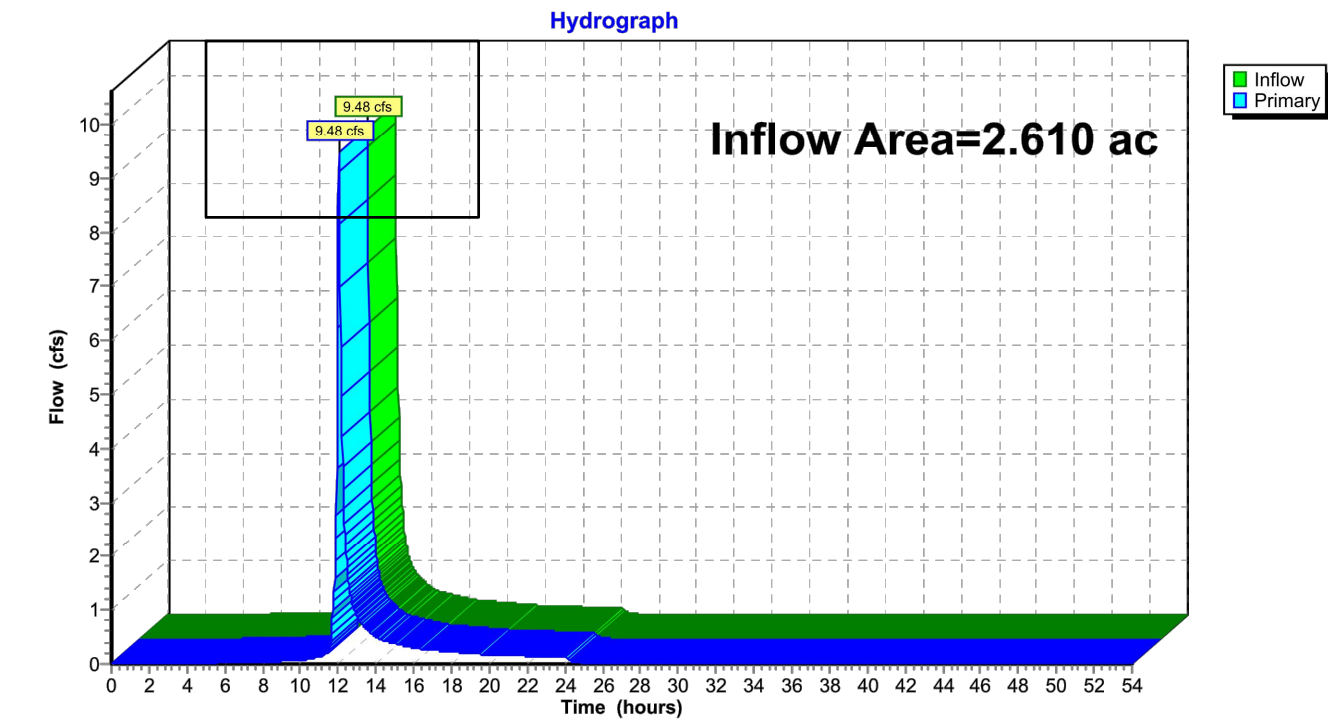
**OUTFALL-1-TRANSIT CENTER-REV1** Type II 24-hr 10 year Rainfall=4.61"  
Prepared by DEWBERRY Printed 11/16/2020  
HydroCAD® 10.00-19 s/n 09482 © 2016 HydroCAD Software Solutions LLC Page 1

**Summary for Link O-1: OUTFALL-1**

Inflow Area = 2.610 ac, 81.23% Impervious, Inflow Depth = 2.69" for 10 year event  
Inflow = 9.48 cfs @ 12.04 hrs, Volume= 0.586 af  
Primary = 9.48 cfs @ 12.04 hrs, Volume= 0.586 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-54.00 hrs, dt= 0.03 hrs

**Link O-1: OUTFALL-1**



**OUTFALL-1-TRANSIT CENTER-REV1** Type II 24-hr 10 year Rainfall=4.61"  
Prepared by DEWBERRY Printed 11/16/2020  
HydroCAD® 10.00-19 s/n 09482 © 2016 HydroCAD Software Solutions LLC Page 2

**Hydrograph for Link O-1: OUTFALL-1**

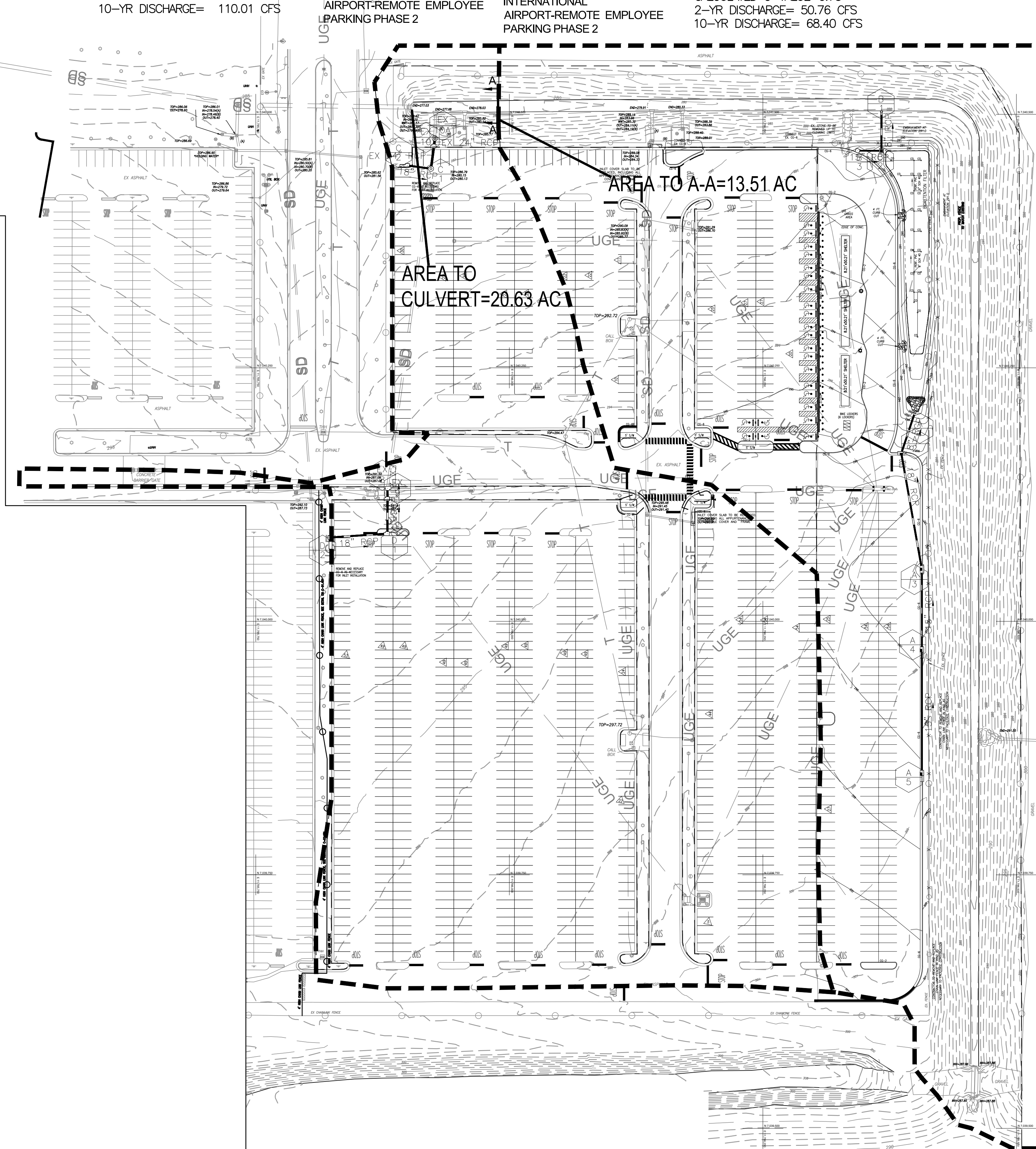
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	0.00	0.00	31.20	0.00	0.00	0.00
0.60	0.00	0.00	0.00	31.80	0.00	0.00	0.00
1.20	0.00	0.00	0.00	32.40	0.00	0.00	0.00
1.80	0.00	0.00	0.00	33.00	0.00	0.00	0.00
2.40	0.00	0.00	0.00	33.60	0.00	0.00	0.00
3.00	0.00	0.00	0.00	34.20	0.00	0.00	0.00
3.60	0.01	0.00	0.01	34.80	0.00	0.00	0.00
4.20	0.01	0.00	0.01	35.40	0.00	0.00	0.00
4.80	0.01	0.00	0.01	36.00	0.00	0.00	0.00
5.40	0.02	0.00	0.02	36.60	0.00	0.00	0.00
6.00	0.02	0.00	0.02	37.20	0.00	0.00	0.00
6.60	0.02	0.00	0.02	37.80	0.00	0.00	0.00
7.20	0.03	0.00	0.03	38.40	0.00	0.00	0.00
7.80	0.03	0.00	0.03	39.00	0.00	0.00	0.00
8.40	0.04	0.00	0.04	39.60	0.00	0.00	0.00
9.00	0.05	0.00	0.05	40.20	0.00	0.00	0.00
9.60	0.06	0.00	0.06	40.80	0.00	0.00	0.00
10.20	0.08	0.00	0.08	41.40	0.00	0.00	0.00
10.80	0.12	0.00	0.12	42.00	0.00	0.00	0.00
11.40	0.21	0.00	0.21	42.60	0.00	0.00	0.00
12.00	8.48	0.00	8.48	43.20	0.00	0.00	0.00
12.60	1.38	0.00	1.38	43.80	0.00	0.00	0.00
13.20	0.76	0.00	0.76	44.40	0.00	0.00	0.00
13.80	0.55	0.00	0.55	45.00	0.00	0.00	0.00
14.40	0.43	0.00	0.43	45.60	0.00	0.00	0.00
15.00	0.38	0.00	0.38	46.20	0.00	0.00	0.0

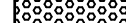
DRAWN BY \_\_\_\_\_ EL, JS  
 APPROVED BY \_\_\_\_\_ DT  
 CHECKED BY \_\_\_\_\_ LR  
 DATE \_\_\_\_\_ DECEMBER, 2020  
 TITLE \_\_\_\_\_

SHEET NO. OF

IN CONCLUSION, THE PROPOSED SITE IMPROVEMENTS DO NOT CONTRIBUTE ADDITIONAL RUNOFF TO THE EXISTING FACILITIES, FLOWS FOR 10-YEAR 24-HR DESIGN STORM ARE LESS THAN THE PRE-DEVELOPMENT PEAK

POST-DEVELOPMENT CONDITIONS  
TO CROSS-SECTION A-A  
TOTAL AREA= 13.51 AC  
IMPERVIOUS= 10.22 AC  
TURF= 3.29 AC  
CALCULATED C-VALUE=0.75  
2-YR DISCHARGE= 50.76 CFS  
10-YR DISCHARGE= 68.40 CFS



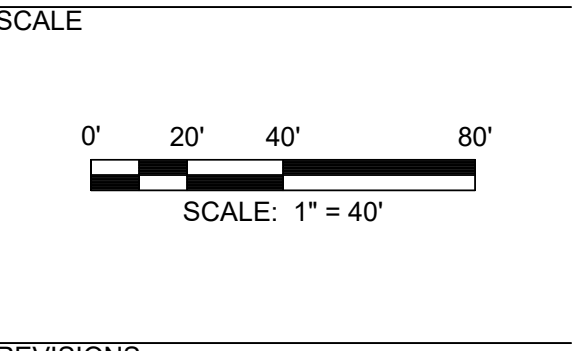
	BYPASS IMPERIOUS
TOTAL POST RE-DEVELOPED AREA INCLUDED IN VRRM SPREADSHEET=	2.73 AC
TOTAL SITE AREA DELINEATION	2.73 AC

TOTAL SITE	0.55
------------	------

Ehlert Bryan  
8600 Westwood Center Drive

Mueller Associates, Inc.

---

[illegible]

APPROVED BY \_\_\_\_\_ DT \_\_\_\_\_

CHECKED BY \_\_\_\_\_ LR \_\_\_\_\_

TITLE \_\_\_\_\_

BMP-VBBM POST

## DEVELOPMENT AREAS

---

SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

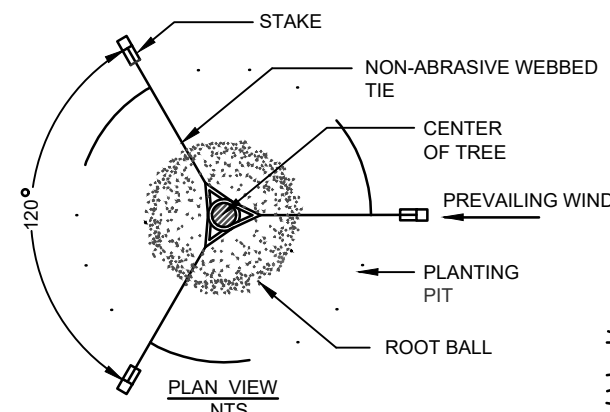
---

Q:\50716530\020\Civil\Eng\Deliverables\C-08.100 LANDSCAPE PLAN.dwg  
Thu, Nov 19 2020 11:06:11 pm

## PLANTING NOTES

REFER TO SPECIFICATIONS FOR LANDSCAPE REQUIREMENTS IN ADDITION TO THE FOLLOWING:

1. AS A MINIMUM, ALL PLANT MATERIAL TO BE NURSERY-GROWN STOCK AND MEET OR EXCEED CURRENT A.N.S.I. STANDARDS BY THE AMERICAN ASSOCIATION OF NURSERYMEN, INC.
2. ALL TREES AND SHRUBS TO BE TOP DRESSED WITH DOUBLE SHREDDED HARDWOOD MULCH AT 2" TO 4" THICK. DO NOT PLACE MULCH WITHIN 6" OF TRUNK.
3. BIORETENTION FILTER MEDIA USED TO BACKFILL PLANTING PITS SHALL BE TESTED BY A LABORATORY RECOMMENDED BY THE USDA AND THE RESULTS SHALL BE SUBMITTED TO THE OWNER FOR APPROVAL AS A BASE LINE. THE MATERIAL SHALL BE AMENDED AS NEEDED TO PROVIDE THE FOLLOWING CHARACTERISTICS AS A MINIMUM: pH RANGE BETWEEN 5.5 AND 7, 5% ORGANIC MATTER AND 100% OF THE MATERIAL SHALL PASS A 2" SIEVE. ALL FILTER MEDIA USED TO BACKFILL PLANTING PITS SHALL BE AMENDED WITH 12-12-12 SLOW RELEASE FERTILIZER AT RATES RECOMMENDED BY THE MANUFACTURER. DATA SHEETS FOR ALL MATERIALS USED AS AMENDMENTS SHALL BE SUBMITTED TO THE OWNER FOR APPROVAL.
4. ALL ROCK AND DEBRIS LARGER THAN ONE INCH (1") SHALL BE REMOVED FROM THE SIDES, BOTTOM, AND BACKFILL SOIL OF THE PLANTING PITS OF ALL PLANT MATERIALS. DISPOSE OF ALL DEBRIS OFF SITE.
5. PLANT QUALITY: ALL SHRUBS SHALL BE DENSE, HEAVY TO THE GROUND AND WELL GROWN, SHOWING EVIDENCE OF HAVING BEEN SHEARED REGULARLY AND SHALL BE SOUND, FREE OF PLANT DISEASE OR INSECT EGGS AND SHALL HAVE A HEALTHY NORMAL ROOT SYSTEM. PLANTS SHALL BE FRESHLY DUG (WITHIN ONE GROWING SEASON) AND NOT HEELED-IN STOCK, NOR STOCK FROM COLD STORAGE. ALL PLANTS SHALL NOT BE IMMEDIATELY PRUNED PRIOR TO DELIVERY. THE SHAPE OF THE PLANT SHALL IN GENERAL CONFORM TO IS NATURAL GROWTH PROPORTIONS UNLESS OTHERWISE SPECIFIED. TREES SHALL CONFORM TO BRANCHING, CALIPER AND HEIGHT SPECIFICATIONS OF THE A.A.N. AND SHALL HAVE A WELL SHAPED, HEAVY BRANCH STRUCTURE FOR THE SPECIES. EVERGREEN TREES ARE TO HAVE AN INTERNODE NO GREATER THAN 18" AND SHALL BE UNIFORMLY WELL SHAPED.
6. THE CONTRACTOR WILL VERIFY PLANT QUANTITIES PRIOR TO BIDDING AND ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE OWNER. THIS CONTRACT WILL BE BASED ON THE BIDDER HAVING VERIFIED, PRIOR TO BIDDING, THE AVAILABILITY OF THE REQUIRED PLANT MATERIALS AS SPECIFIED ON THE PLANT LIST.
7. AS A MINIMUM, THE CONTRACTOR SHALL BE RESPONSIBLE DURING THE CONTRACT AND UP TO THE TIME OF ACCEPTANCE FOR KEEPING THE PLANTING AND WORK INCIDENTAL THERETO IN GOOD CONDITION, BY REPLANTING, PLANT REPLACEMENT, WATERING, WEEDING, CULTIVATING, PRUNING AND SPRAYING, RESTAKING AND CLEANING UP AND PERFORMING ALL OTHER NECESSARY OPERATIONS OF CARE OF PROMOTION OF GOOD PLANT GROWTH SO THAT ALL WORK IS IN SATISFACTORY CONDITIONS AT THE TIME OF ACCEPTANCE, AT NO ADDITIONAL COST TO THE OWNER.
8. AS A MINIMUM, THE CONTRACTOR SHALL APPLY AND BLEND GRANULAR FERTILIZER TO THE SOIL MIX WITH A 10-6-4 ANALYSIS AT THE FOLLOWING RATES: TREE PITS, 1 LBS. PER CALIPER INCH; SHRUB BEDS, 3-5 LBS. PER 100 SQ. FT.; GROUND COVER, 2-3 LBS. PER 100 SQ. FT.
10. TREE PRESERVATION GUIDELINES AND TECHNIQUES TO CONFORM TO THE "VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK," THIRD EDITION, 1992.
11. ALL PLANTINGS IN OR ADJACENT TO WETLANDS ARE TO BE HAND DUG. THE LANDSCAPE CONTRACTOR SHALL NOT DISTURB ANY WETLAND AREAS. MACHINERY IS STRICTLY PROHIBITED IN OR IMMEDIATELY ADJACENT TO WETLAND AREAS. THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR HAVING ALL WETLAND AREAS CLEARLY IDENTIFIED TO THE EXTENT NEEDED FOR THE PROTECTION OF WETLAND AREAS DURING LANDSCAPE INSTALLATION.
12. ALL AREAS TO BE PLANTED OUTSIDE OF SITE CLEARING AND GRADING LIMITS AND WITHIN EXISTING CRITICAL ROOT ZONES TO REMAIN SHALL BE CLEARED AND GRUBBED BY HAND. ALL CLEARING AND GRADING WITHIN THESE AREAS SHALL BE PERFORMED IN A MANNER THAT WILL NOT DAMAGE EXISTING TREES OR COMPACT THE SOILS. THE USE OF POWERED EQUIPMENT IS PROHIBITED. CLEARING AND GRUBBING SHALL INCLUDE BUT NOT BE LIMITED TO THE REMOVAL OF EXISTING FENCING, WOODY SPECIES, ALL INVASIVE SPECIES AND TRASH.

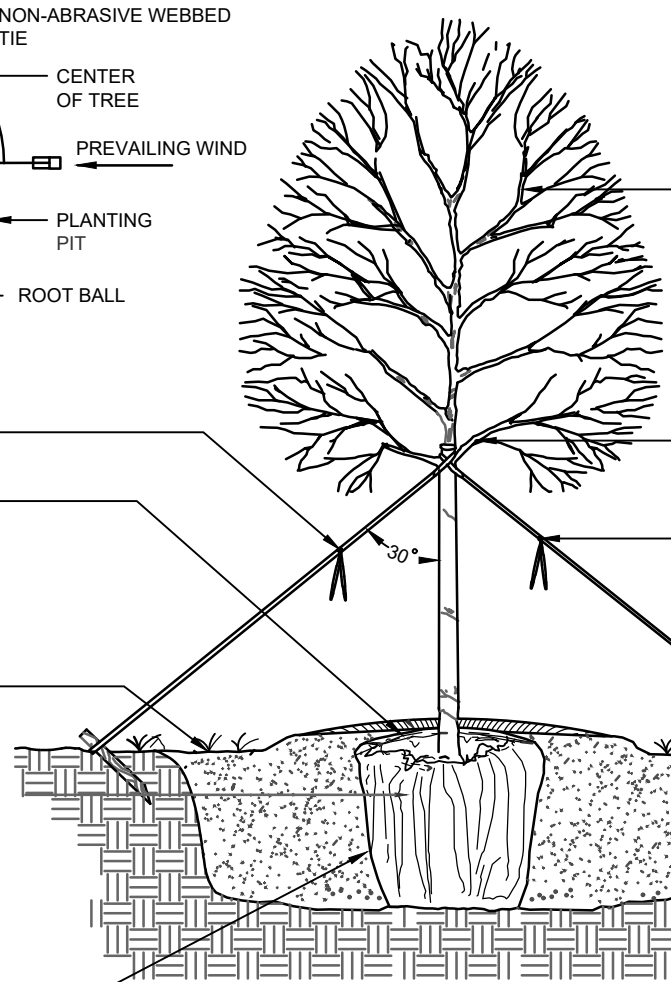


SURVEYOR'S FLAGGING  
MULCH - PROVIDE SHREDDED HARDWOOD. DO NOT PLACE MULCH WITHIN 6" OF TRUNK. DO NOT CREATE SOIL SAUCER.

PLANTING SOIL - SEE SPECS. PLACE IN 12" LAYERS, LIGHTLY TAMP, AND WATER EACH LAYER. WHEN PLANTING IN BIORETENTION PROVIDE APPROVED FILTER MEDIA FOR BACKFILL AMENDED IN CONFORMANCE WITH NOTE 3 THIS SHEET.

REMOVE ALL BALLING ROPES. TOP HALF OF WIRE BASKET(MIN). REMOVE BURLAP FROM UPPER 1/3 OF ROOT BALL

BIORETENTION FILTER MEDIA OR UNDISTURBED SUBGRADE



PRUNE INTERFERING, CROWDED, BROKEN OR LOW BRANCHES CUT FLUSH. LEAVE CAMBIUM EDGE CLEAN. CUT OVAL SHAPE FOR LIMBS OVER 1", TRACING CAMBIUM BACK CLEAN.

BRANCH HEIGHT (A.A.N. STANDRAD)  
NON-ABRASIVE WEBBED TIE. PROVIDE LOOPS 6-8" DIAMETER WIDER THAN TRUNK.

FINISHED GRADE  
3 STAKES PER TREE EQUALLY SPACED 2"x2"x30" HARDWOOD MINIMUM 24" BELOW GRADE.

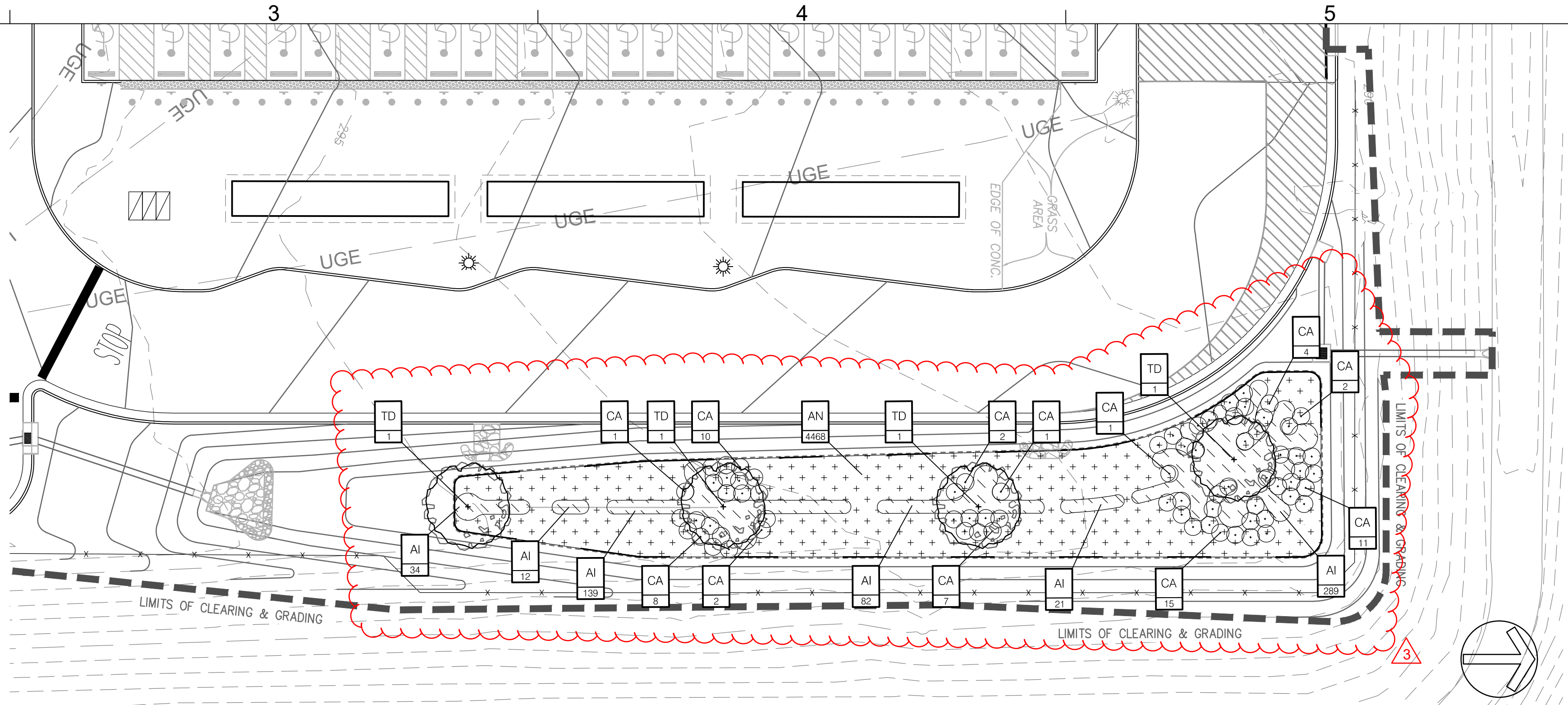
SCARIFY WALLS OF PLANT PITS

NOTE:  
NO SOIL SHALL BE PLACED ABOVE THE ROOT COLLAR.

### A4 LARGE TREE PLANTING

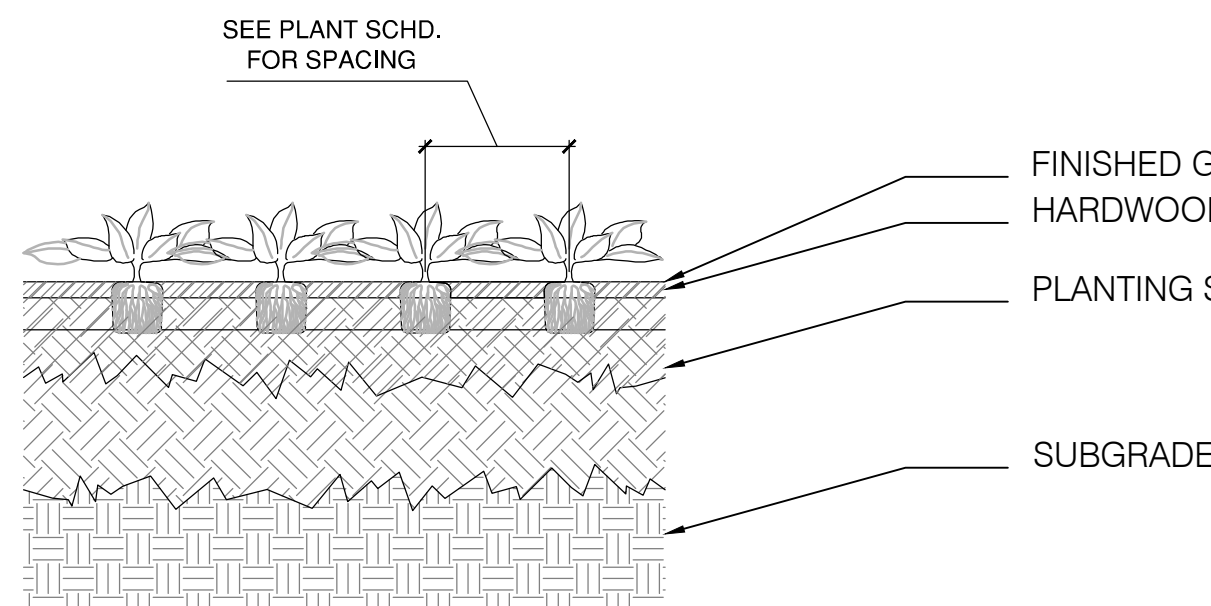
NOT TO SCALE

(2-1/2" CALIPER AND MORE)



### D3 BIORETENTION PLANTING PLAN

1" = 20'

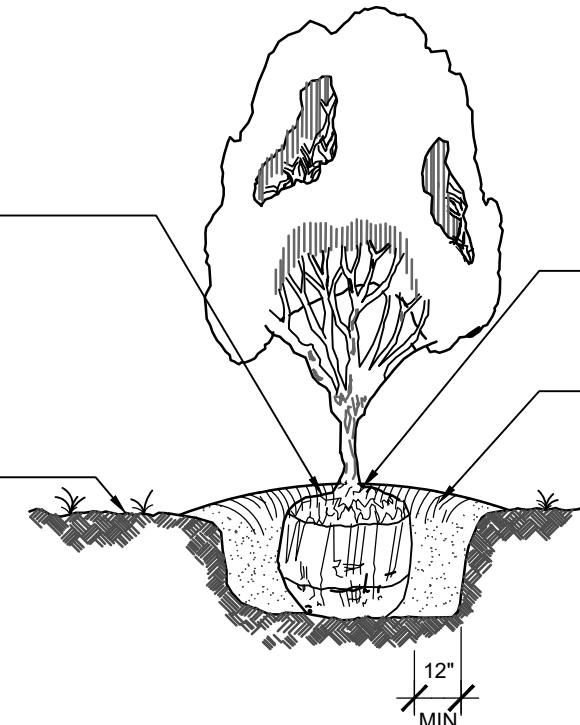


### C3 PERENNIAL PLANTING

NOT TO SCALE

WATER THOROUGHLY TWICE WITHIN THE FIRST 48 HOURS.

MULCH - PROVIDE SHREDDED HARDWOOD. DO NOT PLACE MULCH WITHIN 6" OF STEMS/CANES.  
FINISHED GRADE



### C4 SHRUB PLANTING

NOT TO SCALE

WATER THOROUGHLY TWICE WITHIN THE FIRST 48 HOURS.

## PLANT SCHEDULE

KEY	BOTANICAL NAME	COMMON NAME	PLNT QTY	SIZE	DETAIL	ROOTING	SPACING	REMARKS
TD	Taxodium distichum	BALD CYPRESS	4	3' C	A1	B+B	-	FULL MATCHING HEADS
CA	Clethra alnifolia	SWEET PEPPERBUSH	64	3 GAL	C4	CONT	-	CANE COUNT SHALL MEET ANSI MINIMUMS WITHIN 2" OF ROOT COLLAR.
AI	Asclepias incarnata 'Ice Ballet'	SWAMP MILKWEED	577	QUART	C3	CONT	18" O.C.	SPACING TO BE ON A TRIANGULAR GRID
AN	Aster novae-angliae 'Purple Dome'	NEW ENGLAND ASTER	4468	LP50	C3	FLAT	12" O.C.	SPACING TO BE ON A TRIANGULAR GRID



Dewberry Engineers, Inc.

1503 Edwards Ferry Road  
Suite 200  
Leesburg, VA 20176-6680  
703.771.8004

Ehler Bryan

8609 Westwood Center Drive  
Suite 800  
Tysons, VA 22182  
703.827.9552

Mueller Associates, Inc.

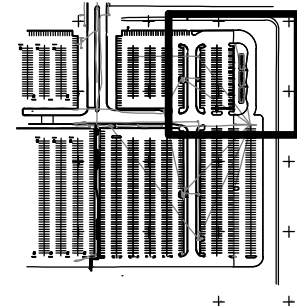
1306 Concourse Dr  
Suite 100  
Linthicum, Maryland 21090  
410.646.4500

## DULLES NORTH TRANSIT CENTER RELOCATION SITE PLAN

DULLES ELECTON DISTRICT  
LOUDOUN COUNTY, VIRGINIA

SEAL

KEY PLAN



SCALE

REVISIONS

NO.	DESCRIPTION	DATE
3	ADDENDUM 4	12/3/20
2	ADDENDUM 2	11/4/20
1	ADDENDUM 1	11/4/20
0	PERMIT SET	9/21/20

DRAWN BY EL JS

APPROVED BY DT

CHECKED BY LR

DATE DECEMBER, 2020

## PLANTING PLAN, NOTES & DETAILS

PROJECT NO.

C-08.100

SHEET NO. OF 59




Dewberry Engineers, Inc  
1503 Edwards Ferry Road  
Suite 200  
Leesburg, VA 20176-6680  
703.771.8004



Mueller Associates, Inc.  
Consulting Engineers  
1306 Concourse Dr., Suite 100  
Linthicum, Maryland 21090  
410.646.4500 tel > 410.646.4738 fax  
www.muellerassoc.com

DULLES NORTH  
TRANSIT CENTER  
RELOCATION  
SITE PLAN  
DULLES ELECTION DISTRICT  
LOUDOUN COUNTY, VIRGINIA

SEAL

KEY PLAN

SCALE

REVISIONS

NO.	DESCRIPTION	DATE
3	ADDENDUM 4	12/3/20
2	ADDENDUM 2	11/4/20
1	ADDENDUM 1	11/4/20
0	PERMIT SET	9/21/20

DRAWN BY EL JS

APPROVED BY DT

CHECKED BY LR

DATE DECEMBER, 2020

FILE

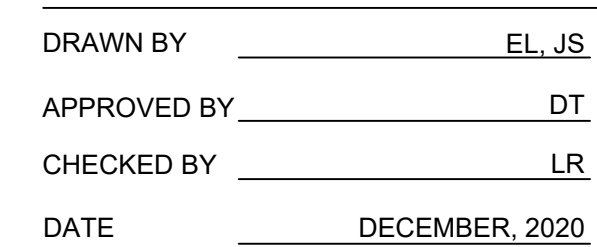
ELECTRICAL LEGEND

PROJECT NO. 20-113-00

E100

SHEET NO. 19 OF 39

WORK OR  
OFF AND WIRING TO



SHEET NO. 19 OF 39



EXISTING PANELBOARD: RP-3 MIN AIC: 10,000 NEMA 1 ENCLOSURE LOCATION: PC-3				BUS RATING: 250A VOLTS: 208Y/120V MOUNTING: SURFACE NOTES: MOUNTED INSIDE PC-3				MAIN: 3P50A MCB PHASES: 3 WIRES: 4 BRANCH CIRCUIT DEVICE: CB					
SERVES				CB		CIRCUIT NUMBER		CB		SERVES			
				P	TA			TA	P				
EX CCTV				1	20	1	2	20	1	EX CCTV			
EX BUS SHELTER LIGHTING				1	20	3	4	20	1	EX LIGHTING CONTROL			
EX EMERGENCY CALL LIGHT				1	20	5	6	20	1	EX EMERGENCY CALL LIGHT			
BUS SHELTER				1	20	7	8	20	1	EX POWER CENTER RECEPT			
BUS SHELTER				1	20	9	10	20	1	SPARE			
BUS SHELTER				1	20	11	12	20	1	SPARE			
SPARE				1	20	13	14	20	1	SPARE			
SPARE				1	20	15	16	20	1	SPARE			
SPARE				1	20	17	18	20	1	SPARE			
SPARE				1	20	19	20	20	1	SPARE			
SPARE				1	20	21	22	20	1	SPARE			
SPARE				1	20	23	24	20	1	SPARE			
SPARE				1	20	25	26	20	1	SPARE			
SPARE				1	20	27	28	20	1	SPARE			
SPARE				1	20	29	30	20	1	SPARE			

LIGHTING FIXTURES						
FIXTURE TYPE	MOUNTING	MANUFACTURER(S)	CATALOG OR MODEL NUMBER	LAMPS	VOLTS	REMARKS
A1	POLE MOUNTED	GARDCO	ECF-L-96L-800-NW-G2-5W	LED (INCLUDED)	277	FOUR POLE MOUNTED LIGHT FIXTURES MOUNTED ON EXISTING 50' TALL POLE. MEASURE MOUNTING PROVISIONS ON EXISTING POLE AND PROVIDE ADAPTERS AS REQUIRED TO MOUNT NEW FIXTURES.
A2	POLE MOUNTED	GARDCO	ECF-L-96L-800-NW-G2-5W	LED (INCLUDED)	277	TWO POLE MOUNTED LIGHT FIXTURES BACK TO BACK MOUNTED ON 30' TALL POLE.
A3	POLE MOUNTED	GARDCO	ECF-L-96L-800-NW-G2-5W	LED (INCLUDED)	277	ONE EAST FACING POLE MOUNTED LIGHT FIXTURE MOUNTED ON EXISTING 50' TALL POLE. MEASURE MOUNTING PROVISIONS ON EXISTING POLE AND PROVIDE ADAPTERS AS REQUIRED TO MOUNT NEW FIXTURES.